AUSTRALI MUSEUM, SYDNEY

ATALOGUE No. 16.

CATALOGUE

OF

AUSTRALIAN MAMMALS

WITH INTRODUCTORY NOTES

ON

GENERAL MAMMALOGY

BY

J. DOUGLAS OGILBY,

Fellow of the Linnean Society of London.

PRINTED BY ORDER OF THE TRUSTEES.

E. P. RAMSAY, F.R.S.E., CURATOR.

1892.

F. W. WHITE, PRINTER.

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MUSEUM OF COMPARATIVE ZOOLOGY LIBRARY HARVARD

PREFACE.

Mr. J. Douglas Ogilby having been engaged by the Trustees of the Australian Museum to prepare a Catalogue of the Australian Mammals, the work now issued is the result. It contains careful descriptions of all known Mammals indigenous to Australia, with notes also on allied fossil forms, compiled from various sources of which the author gives due acknowledgment in his Introduction. Nearly all the species are represented by one or more specimens in the Museum, and those which are not so are indicated by an asterisk placed against their names in the Index. Mr. Ogilby has found it necessary to alter many of the generally recognised names, for reasons which he gives in each case, consequently some of the specimens exhibited in the Museum may not bear the same designation as in the Catalogue. These differences will, however, be remedied on the labels as speedily as possible.

E. P. Ramsay.

December, 1892.

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INTRODUCTION.

THE "Handlist," here submitted to the public, has been compiled more for the use of students and collectors than for scientists, for whom it contains little that is new or of special interest; but it is believed that it will prove helpful, to the student in his earlier endeavors to unravel the mysteries of Nature, and to the collector that it may enable him, round his camp fire in the evening, to determine the specimens which he has obtained during the day. There are, however, besides the student and the collector, scattered over the length and breadth of these Colonies hundreds of educated men, chiefly of the medical profession, who, with all the thirst for research which the study of that profession necessarily engenders, are unable, except at rare intervals, to consult the numerous works which are now indispensable to its comprehension; to these also it is hoped that these pages will prove of assistance by bringing, in however imperfect a manner, the history of Australian Mammalogy up to date, and thus supplying a much needed want. To all I trust that the short introductory notice on mammalian Osteology may be of value, but especially to collectors, on whom the author would wish to impress the imperative necessity of conserving the skeletons, even to the very smallest bone—those of the wrist and the ankle, and the so-called "marsupial bones" should be specially looked after—of all Mammals obtained.

To all, again and again, I must impress the fact that, however beautiful or strange the outside covering of the body may be, the skeleton is of infinitely more value to science; and not to the mammalogist alone but to everyone who sincerely endeavors to comprehend the relationship between the various Families, Orders, and Classes of living creatures with which our earth is peopled.

Since the publication of Mr. Gerard Krefft's "Australian Vertebrata—Fossil and Recent," published in the Catalogue Nat. Industrial Prods. N.S. Wales (1877), no work dealing systematically with Australian Mammalogy as a whole has been attempted. In Mr. Krefft's list 174 recent species are catalogued as against

209 species and 8 well marked varieties in the present list, but several of those entered in the former list as good species, or at least as good species with a query, are here treated as varieties or synonyms of other species.

If this little work should in any degree draw the attention of some at least of those who are fortunate enough to live in the country districts, to the extraordinary richness and the marvellous forms of mammalian life, of which the land of their birth or their adoption is the home, the author's aspirations will have been amply fulfilled.

With two of the Orders of the Eutherian Mammals, the CETACEA and the RODENTIA, the want of material and of works of reference, and, more especially among the *Muridæ*, the multiplication of species and the number of species insufficiently described, have made the task exceptionally difficult, and the author, therefore, trusts that any shortcomings in these Orders will be leniently dealt with.

The work has been compiled from various sources, the chief of which are the British Museum Catalogues of Messrs. Thomas, Dobson, and Gray, the different articles relating to Mammals in the Encyclopedia Britannica, especially that under the heading "MAMMALIA" by Professor Flower; but numerous other works and papers by the same authors, as well as by Owen, Huxley, Mivart, Allen, Scott, Stirling, and others have been consulted and freely drawn from.

In conclusion, I have to tender my best thanks to many friends, in Zoology chiefly to Dr. Ramsay, and in Palæontology to Mr. R. Etheridge, Junr., for valuable hints received and acted on.

J. DOUGLAS OGILBY.

Class.—MAMMALIA.

GENERAL INTRODUCTION.

Mammals are the most highly organized forms of vertebrate animals, and may conveniently be defined as follows :—

Warm-blooded animals, having the heart divided into four cavities, two auricles and two ventricles, and with a complete double circulation ; having the lungs separated from the abdomen by a complete muscular partition, termed the diaphragm ; having the skin more or less clothed with hair in its different modifications ; and with the young produced alive (except in the case of the very few aberrant forms, which constitute the Monotremes or PROTOTHERIA, see p. 1), and nourished for some time after birth by means of the mammary glands with which the female is provided.

Limbs.—In the majority of Mammals the two pairs of limbs are well developed, and specially adapted for progression on the surface of the earth, but they are, in many cases modified to suit the requirements of the particular mode of life to which each individual genus has become habituated. For instance :—in some the fore limbs are specially formed for burrowing, as in the Wombat and Mole ; in others for climbing, as in the Opossums and Monkeys ; in others for flying, as in the Bats ; and in others again for swimming, as in the Seals and Whales, in which case the hind limbs are rudimentary or more often entirely suppressed.

Tail.—Most Mammals are provided with a tail, which, however, may be rudimentary, and therefore functionless, as is the case with the Koala, the Ape, the Deer, and many other genera ; prehensile, or formed for grasping, as with the American Opossums, the Cuscus, and certain families of Monkeys ; or fluke-like and so formed for rapid motion through water, as with the Whales and Dolphins.

TEGUMENTARY STRUCTURES.

Epidermis.—Almost all Mammals are clothed, and in the majority of cases thickly clothed, with a peculiarly modified form of the outer skin, or epiderm, variously known as hair, fur, wool, etc., which has its root at the bottom of a cavity in the derm or true skin. This substance assumes various forms, and is of various sizes and degrees of rigidity, from the soft fur of our Flying Squirrels to the spines of the Echidnas. The obvious purpose of this covering is to protect the skin against external influences, such as cold and damp, and in some cases against the

attacks of enemies. On the Pangolins *(Manidæ)* of Africa and southern Asia alone, true imbricated scales, for the protection of the body, are present; between which, however, isolated hairs occur. Similarly imbricated epidermal productions are also found on the tails of many Rodents, such as the Beaver and the Rat; of some Insectivores, such as *Myogale*; and of some Marsupials, such as the Didelphyidæ; among these Groups, however, these scales are frequently confined to the under surface of the tail. Only the Armadillos of South America possess a true bony exoskeleton (somewhat similar to that of the Tortoises), which is covered with scutes of horny epiderm, and which is eminently fitted for defence against all ordinary enemies. The horns of the Ruminants and Rhinoceroses are also modified forms of epidermis, as also are nails, claws, and hoofs, and the perforated spur of the Monotremes.

Dental System.

Dentition.—In all mammals, except the Narwhal, the teeth of the opposite sides of each jaw are alike in number and character. There are two distinct forms of dentition, the Homodont and the Heterodont; the former, of which the Dolphins are the best exemplars, being, as its name implies, the more simple; in these the crowns are single-pointed and slightly curved, the roots also single and tapering, and all of similar formation, those in the middle of the series being, however, as a rule longer than those at either extremity. In the Heterodont dentition, on the contrary, the teeth are of different forms; the front teeth, or Incisors, are simple and one-rooted, and are adapted for cutting and seizing, while the back teeth, or Molars, have tuberculated or ridged crowns, are supported by two or more roots, and are specially formed for crushing and grinding the food; between these two series there is frequently a longer and more sharply pointed tooth, popularly known as the "*eye-tooth*," and technically—on account of its having attained to its highest development in the Wolves and their allies *(Canidæ)*—termed the Canine. By a similar process of development, though under widely different circumstances, the Marsupial Wolf or Tiger of Tasmania *(Thylacinus)* has arrived at a precisely similar tooth; the use of the canines is principally the tearing of the flesh of their victims and the holding of struggling prey. The molariform series is divisible into two parts, such of the posterior teeth as are without milk-predecessors being termed "Molars," such as have milk-predecessors "Premolars." In the Eutherian Mammals this series is generally constituted of four premolars and three molars, with a milk dentition normally consisting of three, the last premolar having invariably a predecessor; but among the Marsupials this order is reversed in the permanent teeth, the number of premolars being one less and of molars one more, while the milk dentition, if present, is limited to a single

tooth on either side of each jaw, which is the predecessor of the third and last pre-molar. Only in the Anteaters *(Myrmecophagidæ)*, the Pangolins *(Manidæ)*, and the Echidna, are teeth entirely absent at *all* stages of growth.

Skeleton.

Skeleton.—The *skeleton* may be briefly defined as that portion of the body of vertebrate animals which forms the framework on which the muscles are supported. In the adult state the greater part of this framework consists of osseous tissue, or bone, the remainder being cartilage. Bone is mainly built up on a gelatinous basis, strongly impregnated with salts of lime, chiefly phosphate. After the teeth, the bones are the most imperishable of all the organs of the body, and are, therefore, of great value in affording reliable means of affixing the affinities of extinct with recent forms. The skeleton is divided into two parts, the axial, consisting of the skull and vertebral column, and the appendicular, pertaining to the limbs.

Skull.—In the *skull*, or *cranium*, of adult Mammals, all the bones, with the exceptions of the lower jaw, the auditory ossicles, and the bones of the hyoid arch, are immovably articulated together. The cranium, thus formed of numerous originally independent ossifications, consists of a brain-case for the enclosure and protection of that organ, and a face for the support of the organs of sight, smell, taste, mastication, defence, and offence. The brain-case articulates directly with the first cervical vertebra by means of a pair of oval prominences, called *condyles*, placed on each side of the large median foramen, which transmits the spinal cord; this method of articulation is termed *dicondylian*, and is only present in one other class of Vertebrate Animals, the Batrachia, and this, together with several other characters, common to these classes only, has given authority to the apparently well-founded assertion of the remote common origin of the Mammalian and Batrachian types.

Vertebræ.—The *vertebral column* consists of a series of distinct bones, called "*vertebræ*," arranged in close connection with one another along the dorsal aspect of the body in the median line, and extending from the posterior margin of the cranium (to which it is firmly articulated) to the tip of the tail. The number of distinct bones varies greatly, principally owing to the elongation, or otherwise, of that appendage. In the mammalian vertebræ the ends of the centra are usually flattened, but in the cervical region of some Ungulata certain of the vertebræ may be opisthocœlous, that is having the hinder surface concave. The vertebral column is for convenience divided into five regions, cervical, dorsal, lumbar, sacral, and caudal.

Cervical.—The *cervical* region forms the anterior portion of the column, and its first vertebra, called the *atlas*, articulates

with the occipital region of the cranium; these vertebræ constitute the framework of the neck, and in all known recent Mammals, except three—the Manatee *(Manatus australis)*, the Two-toed Sloth *(Cholœpus hoffmanni)* with six, and the Three-toed Sloth *(Bradypus tridactylus)* with nine—consists of seven distinct bones, which, however, are in the case of several genera, notably belonging to the *Cetacea*, in a greater or less number ankylosed together so as to form a solid mass. The second cervical vertebra is termed the *axis*, and, except in certain CETACEANS, always develops a well defined odontoid process.

Dorsal, or *Thoracic.*—Behind these lie the *dorsal*, or, since to its vertebræ only are articulated the movable ribs which form the arch of the thorax, as it would be more correct to term it, *thoracic* region; the anterior rib is attached below to the sternum *(vide infra)*, as are also usually several of those which follow.

Lumbar.—The *lumbar* region consists of those vertebræ in front of the sacrum which bear *no* movable ribs. The number of vertebræ in the conjoined thoracic and lumbar regions is tolerably constant in any given group of animals, any increase of the one being at the expense of the other; the smallest number of thoracico-lumbar vertebræ occurs in the Armadillos *(Dasypodidæ)* which have only fourteen, while the greatest number is found in the *Hyrax* or Rock-Rabbit, the supposed Cony of the Scriptures, in which no less than thirty are present; in Man, the higher Apes, and most Bats, the number is seventeen; in nearly all Marsupials, nineteen.

Sacral.—The *sacral* region is that which is situated between the lumbar and caudal regions; in it the vertebræ are ankylosed together so as to form a single mass; the number of vertebræ included in the sacrum is variable, even in different individuals belonging to the same species, especially as age advances, when certain of the caudal vertebræ become incorporated with those of the true sacrum. These bones are absent in the CETACEA.

Caudal.—The *caudal* vertebræ are those placed behind the sacrum, and terminate the vertebral column. They naturally vary greatly in number, there being usually four only in Man, and those rudimentary, whereas in the West African Long-tailed Pangolin *(Manis longicaudata)* there are as many as forty-six. They are also, for obvious reasons, numerous and highly developed in the *Macropodidæ* and the CETACEA.

Chevron Bones.—To the under-surface of the caudal vertebræ of many Mammals, in which the tail is well developed, are attached by articulation small bones, of the shape of an inverted arch, which have received the name of "*chevron bones.*"

Sternum.—The mammalian breast-bone *(sternum)* is a bone, or series of bones, placed longitudinally in the mesial line, on the inferior aspect of the thorax, and connected with the vertebral column by a series of more or less ossified ribs. It is divided

into three portions, the anterior segment or *presternum*, the posterior or *xiphisternum*, and a varying number between the two called the *mesosternum*. In the Whalebone Whales *(Balænidæ)* only the presternum, supporting a single pair of ribs, is developed.

Ribs.—The *ribs* form a series of long, narrow, more or less flattened bones, extending laterally from the sides of the vertebral column and mostly joined directly or indirectly to the sternum. Those which articulate directly are known as "*true*" ribs, and always belong to the anterior portion of the series, while the posterior ribs, which are either attached each to the edge of its preceding rib, or are free, are called, in the former case "*false*," in the latter, "*floating*" ribs. The portion of each rib nearest to the sternum is usually imperfectly ossified or permanently cartilaginous, and such parts are termed the "*costal cartilages*"; in the rare cases in which they are completely ossified, as in the Armadillos, they are known as "*sternal ribs.*"

Appendicular Skeleton.—The appendicular portion of the framework consists, when fully developed, of two pairs of limbs, an anterior and a posterior.

Anterior Limb.—The *anterior limb* is present and fully developed in all Mammals, and is composed of a shoulder-girdle and three segments of the limb proper, the upper arm *(brachium)*, the fore-arm *(antibrachium)*, and the hand *(manus)*.

Shoulder-girdle.—The *shoulder girdle* is in most Mammals in a modified condition, compared with that in which it exists among the four remaining classes of Vertebrate Animals. In all Mammals, except the Monotremes—in which it is complete and articulated with the sternum—the *coracoid* is only present in the form of a process or even minute tubercle. The blade-bone *(scapula)* is always well developed, has a ridge on its outer surface—the so-called spine of the scapula—which generally terminates externally in a free curved process called the "*acromion.*" The form of the scapula and the development of its processes largely depends on the uses to which the limb is put, for instance whether it be for burrowing, climbing, swimming, or merely for the support of the body. The collar-bone *(clavicle)*, an accessary bar which connects the scapula with the sternum, may be present, as in Man and all Marsupials, except the Bandicoots *(Peramelidæ)*; rudimentary and floating free in the flesh, as in the Dog, Cat, &c.; or entirely absent, as in Seals, Whales, Ungulates, &c.

Brachium and *Antibrachium.*—The proximal segment of the limb consists of a single bone, the *humerus*, and the second segment of two bones, the *radius* and *ulna*, placed side by side, and articulating with the humerus at their proximal, and with the carpus at their distal extremities. In most Mammals these bones cross each other, the radius in front of the ulna, so that the former, though—nominally in vertebrates—external at the upper end is internal at the lower. In the majority of Mammals the

bones are fixed in this position, but in a few, as in Man, a free movement of crossing and uncrossing—technically known as pronation and supination—is allowed. In most Quadrupeds the ulna is much reduced in size, and the radius, especially at its upper end, correspondingly increased, so that the articular surface of the latter extends across the entire anterior surface of the humerus, and thus the bones become anterior and posterior, instead of external and internal.

Manus.—The skeleton of the terminal section of the anterior limb consists of three divisions:—(1) the *carpus*, a group of small, more or less rounded or angular bones, with flattened surfaces contiguous to one another, which, though articulating by synovial joints, that is joints enclosing a capsule which secretes a lubricating fluid, have, nevertheless, scarcely any motion between them; (2) the *metacarpus*, a series of bones, placed side by side, and with their proximal ends articulating by almost immovable joints with the carpus; and (3) the *phalanges*, or bones of the digits proper, which are usually three in number to each digit, and articulate to one another, and the first to the distal end of the corresponding metacarpal bone, by freely movable hinge-joints.

Carpus.—The mammalian *carpus* consists of two transverse series of bones, of which the upper or proximal, series contains three bones, that on the radial side, from which side all these bones are counted, being known as the *scaphoid*, that in the middle the *lunar*, and that on the left the *cuneiform* bone; the lower or distal series contains five bones, of which the two outer are always united into a single bone, and receive a common name; these have been respectively termed the *trapezium*, *trapezoid*, *magnum*, and *unciform*: between these two series a single bone, the *central*, may or may not be present. Two additional bones are generally developed in the tendons of the flexor muscles, one on each side of the carpus, which may be called the *radial* and *ulna sesamoid* bones; the latter of these, which is the more constant, and generally the larger, has received the distinctive title of the *pisiform* bone.

Metacarpus and *Phalanges.*—The metacarpal bones are never more than five in number, nor are the digits which they assist in supporting; they are described numerically as first, second, etc. The digits have each a distinguishing name, the *pollex* (thumb), *index*, *medius*, *annulus*, and *minimus*. One or more of these may be in a rudimentary condition, or altogether suppressed, and where only one is absent it is generally the pollex. No Mammals, except the CETACEA, have more than three phalanges to each digit, while in the pollex one of the three is constantly absent. The terminal phalanges are usually specially modified to support the nail, claw, or hoof, and are termed *ungual* phalanges. Distinguishing terms are applied to the mode of

progression employed by various quadrupeds, according to the amount of palmar and plantar surfaces in contact with the ground; thus those, as the Bears, which use the whole of the lower surface of the carpus, metacarpus, and phalanges, are termed "*plantigrade*"; those, as the Horse, which apply the distal surface of the ungual phalanx and the horny structures surrounding it, "*unguligrade*"; intermediate forms exist, such as "*phalangigrade*" for the Camel, and "*subplantigrade*" for most Carnivores. In the Bats the digits are enormously elongated for the purpose of supporting a cutaneous expansion constituting the organs of flight; while in the Whales and Dolphins the manus is formed into a paddle, covered by continuous integument, and without any trace of nails or claws, and the number of phalanges belonging to the second and third digits always exceeds the normal number in Mammals, and sometimes very considerably.

Posterior limb.—The *posterior limb* consists of a pelvic girdle, and three segments belonging to the limb proper, the thigh *(femur)*, the leg *(tibia* and *fibula)*, and the foot *(pes)*.

Pelvic girdle.—The pelvic girdle is present in some form in all Mammals, but in the Sirenians and Cetaceans it is in a very rudimentary condition. Each half of this girdle consists of three bones, which in the adult state are ankylosed together into a solid mass, and the single bone thus formed is technically known as the "*os innominatum*." Of the three sections of which this bone is composed, the upper *(ilium)* is firmly articulated to the sacrum, and of the two lower, the antero-inferior *(pubis)* forms a symphysis with its fellow of the opposite side, except in the Insectivorous genera, *Soricidæ*, *Talpidæ*, and *Chrysochloridæ*, where these bones are entirely separated, while the postero-inferior *(ischium)* are never united. These three sections unite around a cup-shaped cavity, the *acetabulum*, into which the proximal end of the femur is received. Between the pubis and ischium there is a large opening known as the "*obturator foramen*." The two innominate bones, in conjunction with the sacral, form the *pelvis*. By this direct articulation of the innominate bones with the vertebral column, greater strength is given to the hind limbs to increase their powers of supporting and propeling the body. In the Monotremes and Marsupials an additional pair of thin, flat, elongated bones, called the "*epipubic*" or "*marsupial*" bones, the exact function of which is but imperfectly understood, is attached to the fore part of the pubis, and projects forward into the muscular wall of the abdomen.

Thigh and *Leg.*—As with the fore-limb, the proximal segment of the hind limb has but one bone, the *femur*, and the second two, the *tibia* and the *fibula*; these lie parallel to one another, the former, which is much the more strongly developed being on the inner side and more to the front, while the latter is on the outer side and behind. They are never either permanently

crossed or capable of any considerable amount of rotation, as in the corresponding bones of the antibrachium. In many Mammals the fibula is rudimentary, and in some, as certain ruminants, it forms, in old animals, a more or less complete ankylosis with the tibia. A large sesamoid bone, known as the knee-cap or "*patella*," is developed in the tendon of the extensor muscle of the thigh, in front of and for the protection of the knee-joint, and is present in an ossified condition in all Mammals, excepting some of the Marsupials.

Foot.—The terminal segment of the hind limb, like that of the fore limb, consists of three parts, of which the proximal is termed the *tarsus*, the median the *metatarsus*, and the distal the *phalanges*. In the tarsus the proximal series always consists of two bones, the *astralagus*, representing the coalesced scaphoid and lunar of the hand, and the *calcaneum*. The former is placed more to the dorsal side of the foot, and almost exclusively furnishes the tarsal portion of the ankle joint; the latter is situated more towards the plantar side of the foot, and is elongated backwards to form a more or less prominent tuberosity (the heel) to which the tendon of the great extensor muscles of the foot is attached. The *navicular* bone is interposed between the proximal and distal series on the inner side of the foot, thus leaving the two series in contact on the outer side. The distal series, when complete, contains four bones, which, beginning as usual on the inner side, are the three *cuneiform*, the internal being known as the first or *ento-cuneiform*, the median as the second or *meso-cuneiform*, and the external as the third or *ecto-cuneiform;* of these the second is the smallest, and all three are articulated to the distal surface of the navicular; the fourth bone is the *cuboid*, and articulates with the calcaneum; in Mammals where the hallux is wanting, the ento-cuneiform may be rudimentary or altogether absent. The three cuneiform bones support the first, second, and third metatarsal bones, and the cuboid the fourth and fifth; as in the hand *sesamoid* bones are developed in addition to the constant bones of the tarsus. The formation of the phalanges of the foot is in all respects similar to that of the hand, and, with the one exception of the inner digit—which is termed the hallux, and corresponds to the pollex of the hand—the names applied to the other digits of the foot are the same as those by which the corresponding digits of the hand are known. In the hallux, as in the pollex, one bone of the normal mammalian four—including the metacarpals and metatarsals—is wanting, and it is still a disputed question whether the missing bone is the first metatarsal, or the proximal phalanx. In the SIRENIA and CETACEA no traces of the third or distal segment of the hind limb have been discovered, and only in certain members of the latter Order have even rudiments of the proximal and median segments been detected.

Subclass I.—PROTOTHERIA.

The Monotremata or Ornithodelphia, as the Prototherian Mammals have been variously, and more or less misleadingly termed, comprise the lowest, and in point of time the most ancient, types of mammalian life. Two families only, consisting of three genera, exist at the present time, the extent of their range being confined to Australia and Tasmania *(Ornithorhynchus* and *Echidna)* and New Guinea *(Proechidna* and *Echidna)*. They are oviparous, and the young are nourished after emerging from the egg by milk expressed from the mammary glands into a temporary pouch; these glands are not provided with nipples, the milk being forced out through numerous apertures in the spongy skin. The method employed in hatching out the eggs differs materially in the two families, for while the Platypus forms a nest in its burrow on which to deposit its eggs, and hatches them out by the warmth of its body in the same manner as birds do,—the pouch being at no time sufficiently developed to enable the animal to retain the eggs therein—the Echidna carries its eggs about with it and hatches them out in its more highly specialized pouch. The males are provided with a perforated spur on the inside of the heel, which is connected by a duct with a postfemoral gland, and the functions of which are not as yet clearly understood; the assumption that it is a poison-organ is not however borne out by actual evidence, while on the contrary it is difficult to imagine of what possible value such an organ could be to animals so constituted; it is, however, possible that it may develop such a function in a greater or less degree during the breeding season, and be used as a weapon of defence in contesting for the favor of the females. The Monotremes possess an additional clavicular bone, in the shape of a large T-shaped interclavicle, which bone is not represented in either of the other mammalian Subclasses; the coracoid bone is complete and articulates with the sternum. Epipubic bones are present. True functional teeth are absent in the adults.

Order I.—MONOTREMATA.

Muzzle produced into a beak, which is either flattened or cylindrical. External ear-opening without a conch. Limbs subequal in length, short and powerful. Tail either short and broad or rudimentary. Mammæ rudimentary.

Family I.—ORNITHORHYNCHIDÆ.

Muzzle in the shape of a broad, flattened, horny beak. Tongue not extensile. Fur not mixed with spines. Tail well developed, broad, and flattened. Hands and feet modified as swimming-organs, the toes broadly webbed. Palms and soles naked, without pads. Teeth rudimentary, only found in young animals, in which there are two on either side of the upper jaw and three on either side of the lower jaw, these being persistent till the animal is rather more than one-third grown; never cutting the gum; multicuspid; replaced in the adults by strong, horny plates. Cerebral hemispheres smooth.

Genus I.—ORNITHORHYNCHUS, *Blumenbach* (1800).

Form elongate and depressed. Toes 5—5, all with long claws, which on the fore feet are broad and blunt, on the hind feet compressed and pointed. Beak short, with a basal projecting leathery flap both above and below. Cheeks pouched.

Vertebræ.—C. 7, D. 17, L. 2, S. 2, Cd. 20 or 21 = 48 or 49.

Habits.—Aquatic; fossorial; feeding on crustaceans, mollusks, water-insects, worms, &c.

Note.—Under the name of *Ornithorhynchus agilis*, Mr. C. W. De Vis has described (*Proc. Roy. Soc. Queensland*, 1885, p. 35, pl. iv.) from a right tibia and the distal half of a right mandible, what appears to be a very distinct species of fossil Platypus; reversing the general laws in such cases, this extinct species, which from the dentition is unquestionably adult, must have been of a considerably smaller size than its living representative. The fossils were excavated on King's Creek, an affluent of the Condamine River, near Pilton, South Queensland. Shaw's name *Platypus* (1799) having been employed by Herbst six years previously for a genus of Coleopterous Insects is inadmissable.

1. Ornithorhynchus anatinus, *Shaw, sp.* (1799).

Duck-billed Platypus; Water Mole.

Male much larger than female. Fur short, close, and velvety. General color above deep umber- or blackish-brown; below grayish-white; a white or yellowish spot round the eye; tail colored above like the back, generally naked below; bill black above, yellow and black below.

Dimensions.—Head and body of male, about eighteen, of female about fourteen inches; tail of male about six, of female about five inches.

Habitat.—Queensland southwards of 18° S. lat., New South Wales, Victoria, South Australia, and Tasmania.

References.—Thomas, B.M. Catal. p. 388 ; Gould, Mamm. Austr. i. pl. i.

Family II.—ECHIDNIDÆ.

Muzzle in the shape of a slender cylindrical beak. Tongue extensile. Fur mixed with stout spines. Tail rudimentary. Toes not webbed. Palms and soles forming broad, fleshy cushions, without distinct pads. Teeth wholly absent, without functional successors. Palate and tongue spinous. Cerebral hemispheres convoluted.

Genus I.—ECHIDNA, *G. Cuvier* (1798).

Form stout and depressed. Toes 5—5, all clawed, those on the fore feet broad, but little curved, and directed forwards ; on the hind feet slenderer, curved outwards, the second, or second and third, very long, much exceeding the fourth and fifth ; that of hallux short, blunt and rounded. Beak straight or with a slight upward curve. Tongue tapering at the tip, the spines restricted to the basal portion.

Vertebræ.—C. 7, D. 16, L. 3, S. 3, Cd. 12 = 41.

Habits.—Terrestrial ; fossorial ; feeding chiefly on ants and their eggs.

Note.—In 1868 Mr. Gerard Krefft described (Ann. Nat. Hist. (4) i. p. 113) from a fragment of a humerus a fossil species from New South Wales for which he proposed the name *Echidna oweni ;* subsequently numerous examples were obtained from the Wellington Caves, N.S.W., and were separated from the original species by Prof. Owen under the name of *E. ramsayi.* Palæontologists now, however, seem to be agreed that the two forms are identical.

1. Echidna aculeata, *Shaw, sp.* (1792).

Common Echidna ; Native Porcupine.

Sexes not markedly differing in size. General color of hair above black or dark brown ; below brown. Spines of back long and stout, generally quite hiding the hair, their color normally yellow with a black tip. Tail short and conical, terminally naked.

Several different species of Echidna have been described, but recent researches tend to prove that these are at best but geographical races. The Port Moresby variety *(E. lawesi,* Ramsay) the type of which is in the Australian Museum, Sydney, differs in its smaller size and shorter dorsal spines ; the Tasmanian variety *(E. setosa,* E. Geoffroy) in its larger size, longer hair which almost conceals the spines, and the much longer third claw of the hind feet, which almost equals the second claw.

Dimensions.—Head and body, *E. lawesi*, about fourteen inches; *E. aculeata*, about seventeen, and *E. setosa* about twenty.

Habitat.—From South-eastern New Guinea throughout the whole of Australia to Tasmania.

References.—Thomas, B.M. Catal. p. 377; Gould, Mamm. Austr. i. pls. ii. *(E. aculeata)*, iii. *(E. setosa)*.

Subclass II.—METATHERIA.

The Metatherian Mammals, more generally known as the Didelphia or Marsupialia, are at the present time, with the exception of the True Opossums *(Didelphyidæ)* of the New World, confined to the Australian, Papuasian, and the eastern islands of the Austro-Malayan subregions; the easternmost point to which their range extends being the Island of San Christoval, belonging to the western section of the Solomon Archipelago, where the short-headed variety of the Gray Cuscus *(Phalanger orientalis* var. *breviceps)* is found; the Group was however at a former period much more generally distributed over the surface of the earth, species having been discovered in a fossil state in Europe, South Africa, and America. They differ from all other Mammals by the presence in the female of a permanent pouch *(marsupium)*—obselete in *Myrmecobius* and practically so in *Phascologale*—formed by a fold in the integument, and which is furnished with a varying number of teats, to which the young are attached at a very early stage of growth by the mother, who, by means of specially adapted muscles, forces the milk from the mammæ into their mouths, their condition being for a considerable period so imperfect as to preclude the possibility of their obtaining nutriment of their own volition. Both sexes are provided with long epipubic bones, generally known as "*marsupial bones*," though having in reality no connection whatever with the pouch; these bones are rudimentary in *Thylacinus*, while in the Bandicoots *(Peramelidæ)* the clavicles are wanting.

Order I.—MARSUPIALIA.

Limbs subequal, or the hinder pair much the larger and forming the chief agents in progression. Tail almost invariably present, generally long, and often prehensile. Teeth very variable in structure. Mammæ in varying numbers.

Suborder I.—Polyprotodontia.

Incisors numerous, four or five in the upper, three or four in the lower jaw, subequal, much smaller than the canines. Molars generally sharply cuspidate.

Habits.—Carnivorous; insectivorous; rarely omnivorous.

Family I.—NOTORYCTIDÆ.

Limbs subequal, short, and very strong. Fore feet with five digits; hind feet asyndactylous, with five toes; hallux clawed; the other toes unequal in size. No visible external eyes. Ears without conch. Clavicle well developed. Chevron bones present.

Genus I.—NOTORYCTES, *Stirling* (1891).

Dorsal aspect of snout covered by a hard horny shield, which is divided into two segments by a transverse ridge. Mouth ventral in position. Ear openings present, but almost completely concealed by the overhanging fur. Tail hard, tough, and leathery, marked by conspicuous annular rings, thick at its insertion but rapidly decreasing in size towards its extremity, which is blunt and knob-like. The four inner toes of both fore and hind feet clawed, the fifth with a short, broad, horny nail. Palms and soles naked, covered with tough, leathery, wrinkled skin; the latter traversed by oblique folds. The claws of the third and fourth digits enormously developed; those of the corresponding toes curved outwards and backwards. Pouch opening backwards. Mammæ two, minute.

Vertebræ.—C. 7, D. 15, L. 4, S. 6, C. 12 = 44.

Dentition.—I. $\frac{1.2.3.4}{1.2.3}$, C. $\frac{0}{0}$, P. $\frac{1.0.3.4}{1.0.3.4 \text{ or } 0}$, M. $\frac{1.2.3.4}{1.2.3.4} \times 2 = 40$ to 42.

Habits.—Terrestrial; fossorial; insectivorous.

Note.—The axis and four succeeding cervical vertebræ are firmly ankylosed together, as are also all the sacral vertebræ. In the dental formula given above I have preferred to consider the teeth, which Dr. Stirling figures as an upper and lower canine, as a fourth upper and third lower incisor.

1. Notoryctes typhlops, *Stirling* (1888).

Marsupial Mole.

Size small, form stout. Fur long, soft, of a bright lustrous silken appearance; sometimes darker across the loins; a patch of darkish red fur surrounding the pouch; interior of pouch sparsely lined with reddish fawn-colored hairs. Upper surface of tail clothed with fur similar to that of the back on its anterior half; the sides and lower surface naked.

Dimensions.—Head and body about five inches; tail about one and one-fifth inch.

Habitat.—Central South Australia.

References.—Stirling, Trans. Roy. Soc. South Austr. 1888, p. 21, and 1891, p. 154, pls. ii. – ix.

Note.—In the attempt to formulate the above divisional and generic definitions for Dr. Stirling's *Notoryctes typhlops*, I have

experienced considerable difficulty in the selection of such characters as appear to be most suitable for the purpose. Dr. Stirling, in his papers quoted above, though at present the only scientist who has had the opportunity of examining the anatomical characters, offers no suggestion as to the definite place which it should take in the zoological system, and I have therefore endeavored to intercalate it among those forms to which it seems to me to make the nearest approach from a structural point of view. The conclusion at which I have arrived, after an exhaustive study of Dr. Stirling's pamphlet, is that in this animal we have at last obtained a definite connecting link between the Monotremes and Marsupials. In the present initial state of our knowledge it would, in my judgment, be presumptuous to class *Notoryctes* among the Monotremes proper, nevertheless several of our leading naturalists incline to the opinion that its affinities are closer to these Mammals than to the Marsupials; at present, however, I prefer to look upon it as an aberrant Polyprotodont. If the former view be correct we have here an adult Monotreme possessing fully developed teeth, and it must not be lost sight of that in *Ornithorhynchus*, as previously mentioned (vide p. 2), teeth are developed in both jaws until the animal is fully one-third grown, though our knowledge of the early life of this latter animal is not sufficient to enable us to decide whether these teeth are functional or otherwise; it is, however, on this character, and so far as I can determine with the slender means at my disposal, on this character alone, that I base my opinion of its polyprotodont affinities; the absence of canine teeth, if I am correct in my suggestion that those considered by Dr. Stirling to be canines are respectively the fourth upper and third lower incisors, militates against its position as a typical Polyprotodont, but strengthens its position as a true connecting link between the MONOTREMATA and POLYPROTODONTIA; if on the other hand Dr. Stirling has taken the correct view of the nature of the teeth in question, my contention as to the polyprotodont character of *Notoryctes* is materially strengthened; in any case our knowledge is so limited, and our lack of information as to its milk dentition, if any, so absolute, that it would not be wise to separate it from the polyprotodont Mammals. Further the semirudimentary nature of the pouch, which wholly, or at any rate partially, disappears when not in use, points to a connection on the one hand with *Myrmecobius* and *Phascologale*, and on the other hand with the PROTOTHERIA; Dr. Stirling informs me *in literis* that a pair of minute mammary elevations are present, situated near the corners of the posteriorly expanded pouch The form of the feet and the character of the horny shield on the snout also ally *Notoryctes* to *Echidna*. Putting aside these external characters, we have not far to seek in the skeleton for confirmatory evidence of its affinity to the Monotremes, the considerable

development of the clavicle, which is connected by a ligament to the sternal apparatus, along with the rudimentary character of the epipubic bones, being also monotrematous; this latter character, however, it shares with the Dasyurine *Thylacinus*. Referring back to the clavicular development the fact must not be lost sight of that this bone is reduced to a mere knob-like process in the Dasyures and is entirely absent in the Bandicoots, while in the Monotremes it connects by true ossification with the sternum. It may be sought to explain away this difference in the strength of the shoulder-girdle on the grounds that *Notoryctes*, *Echidna*, and *Ornithorhynchus* have the fore-limbs strengthened, in order to enable them to burrow with the greater ease, but the superficiality of such a view is demonstrable at a glance if we take into consideration the fact that the *Peramelidæ*, which are also of fossorial habits, though not in so marked a degree as the genera mentioned above, are absolutely without rudiments of these bones. The method of reproduction in *Notoryctes* is undeniably one of the most interesting problems of the day in the world of science, and when solved will at once set at rest the question of its affinities.

It seems probable that, though so essentially a burrowing animal, *Notoryctes* does not live in a burrow, but makes a nest in tussocks of grass, or at the roots of small shrubs, burrowing, like the *Peramelidæ*, for food only. Its method of progression is somewhat analogous to that of a Dolphin as, according to Dr. Stirling's informants, it travels for varying distances at very few inches beneath the surface, then emerging crawls along the surface for a few feet, and again dives below; this seems to be necessary to the act of respiration. As fast as it bores by means of the fore feet and horny snout it closes up the burrow behind it with its hind feet.

Finally, should the theory above advanced prove correct, we have now obtained a definite link between the proto- and metatherian Sub-classes—a link which is somewhat analogous in position to that held by *Branchiostoma* between the vertebrate and invertebrate animals—and which will perhaps eventually bridge over the gulf which at present separates the Monotremes from the Marsupials. It is, however, probable that it is to embryological and palæontological research alone that we must look for the elucidation of the problem briefly hinted at above.

In a work of this kind it is impossible to go more fully into the subject of this interesting animal.

Family II.—DASYURIDÆ.

Thylacine; Native Cats; Pouched Mice, &c.

Limbs subequal. Fore feet with five digits; hind feet asyndactylous, with four or five toes; hallux small and clawless, or

absent; the other toes subequal. Stomach simple. Cœcum absent. Pouch, when present, opening forwards or downwards, sometimes rudimentary, rarely obsolete.

Subfamily I.—Myrmecobiinæ.

Tongue long, cylindrical, and extensile. Rhinarium naked, grooved below. Lower lip pointed, projecting beyond the teeth. Chest with a complex gland opening to the surface by several large and distinct apertures. Molars small and delicate, more than four in number in each ramus, those of the lower jaw with the inner cusps larger than the outer.

Genus I.—MYRMECOBIUS, *Waterhouse* (1836).

Form graceful and squirrel-like. Ears long and narrow. Toes 5 - 4, provided with long fossorial claws; hallux absent externally. Palms naked, soles partially so; pads small and granulated. Tail long and bushy. Pouch obsolete. Mammæ four *(Thomas)*, but Gilbert states *(Gould. Mamm. Austr.)* that he has "observed seven young attached to the nipples."

Dentition.—I. $\frac{1.2.3.4}{1.2.3.0}$, C. $\frac{1}{1}$, P. $\frac{1.0.3.4}{1.0.3.4}$, M. $\frac{1.2.3.4.5.0}{1.2.3.4.5.6 \text{ or } 0} \times 2 = 50$ to 52.

Habits.——Terrestrial; arboreal; insectivorous.

Note.—A fourth incisor is rarely present in the lower jaw.

1. Myrmecobius fasciatus, *Waterhouse* (1836).

Marsupial Anteater.

Fur short, close, and hispid. General color above bright rufous, grizzled on the head, darkening posteriorly, where it is transversely banded with white; a white stripe over each eye; below clear pale yellow. Ears pointed, clothed with close, short hairs, rufous behind, yellowish inside. Claws dark horn-color. Third finger shorter than second or fourth. Palms with five small, round, finely granulated pads; soles hairy along the edges, with only three pads. Tail long-haired above, shorter-haired below; the former grizzled yellow and black, the latter rich rufous.

Dimensions.—Head and body about ten inches; tail about seven inches.

Habitat.—South and West Australia.

References.—Thomas, B.M. Catal. p. 312, pl. xxiii. fig. 10 *(sole)*; Gould, Mamm. Austr. i. pl. iv.

Note.—Mr. Thomas remarks:—The chief interest of this remarkable genus lies in its close resemblance and, presumably, relationship to the Mesozoic Polyprotodont Marsupials *(Phascolotherium, Amphilestes,* &c.) of the English Jurassic beds, the resem-

blance being so close as to suggest that *Myrmecobius*, like *Ceratodus*, is actually an unmodified survivor from Mesozoic times.

Subfamily II.—Dasyurinæ.

Tongue short, simple, not extensile. Lower lip rounded, not produced. Chest without gland. Molars large, four in number in each ramus; those of the lower jaw with the outer cusps larger than the inner.

Genus II.—ANTECAINOMYS, *Krefft* (1866).

Body unspotted. Ears very large. Tail very long, tufted. Limbs unusually elongated; the fore-arm, lower leg, and hind foot disproportionately long. Toes short and subequal; hallux absent. Palms and soles without distinct pads, the greater part of the latter hairy. Mammæ? Canines very small.

Dentition.—I. $\frac{1.2.3.4}{1.2.3}$, C. $\frac{1}{1}$, P. $\frac{1.0.3.4}{1.0.3.4}$, M. $\frac{1.2.3.4}{1.2.3.4} \times 2 = 46$.

Habits.—Terrestrial; saltatory; insectivorous.

1. Antechinomys laniger, *Gould, sp.* (1856).

Woolly Pouched Mouse; Jerboa Pouched Mouse.

Size small; form slender and graceful. Fur long, soft, and fine. General color above slaty gray; below white; a fawn-colored patch behind the ear. Ears ovoid, almost entirely clothed with short, fawn-colored hairs. Lower part of limbs, hands, and feet white. Tail very long, slender, short-haired, fawn-colored except the terminal inch which is tufted and black.

Dimensions.—Head and body about three and a half inches; tail about five inches.

Habitat.—Interior of New South Wales and Southern Queensland.

References.—Thomas, B. M. Catal. p. 309, pls. xxiii. fig. 9 *(sole)*, xxv. figs. 11 & 12 *(skull)*; Gould, Mamm. Austr. i. pl. xxxiii.; Alston, P.Z.S. 1880, p. 545, pl. xlv.

Note.—Through want of information respecting its habits, Gould's figure represents a pair seated on the bough of a tree; the figures also are very misleading.

Genus III.—SMINTHOPSIS, *Thomas* (1887).

Body unspotted. Form slender and delicate. Ears large and broad. Tail moderate or short, short-haired, sometimes incrassated. Feet slender and delicate. Toes subequal, with small, delicate claws; hallux present, short and clawless. Soles partially

hairy, the naked part granulated, with or without pads, which, when present, are not or but indistinctly striated. Pouch well developed. Mammæ eight or ten.

Dentition.—I. $\frac{1.2.3.4}{1.2.3}$, C. $\frac{1}{1}$, P. $\frac{1.0.3.4}{1.0.3.4}$, M. $\frac{1.2.3.4}{1.2.3.4} \times 2 = 46$.

Habits.—Terrestrial; insectivorous.

Note.—Gould's name *Podabrus* (1845) cannot stand, having been previously (1840) bestowed upon a genus of Coleopterous Insects by Fischer.

1. Sminthopsis crassicaudata, *Gould, sp.* (1844).

Thick-tailed Pouched Mouse.

Size small; form light and delicate. Fur very soft and fine. General color above clear ashy-gray; below grayish-white; chin white. Ears very large and rather pointed, their backs dark brown anteriorly, strongly contrasting with the lighter hues posteriorly. Hands and feet white. Greater part of soles clothed with velvety hairs; naked parts granulated, without distinct striated pads. Tail short, incrassated, tapering, gray above, white below. Mammæ ten.

Dimensions.—Head and body about three and a half inches; tail about two inches.

Habitat.—All Australia except the extreme North.

References.—Thomas, B.M. Catal. p. 303, pls. xxiii. fig. 8 (*sole*), xxv. fig. 10 (*teeth*); Gould, Mamm. Austr. i. pls. xlvi. (*S. macrurus*), xlvii. (*S. crassicaudata*).

2. Sminthopsis murina, *Waterhouse, sp.* (1837).

Common Pouched Mouse.

Size small; form very slender and delicate. Fur soft and fine. General color above finely grizzled mouse-gray; below grayish-white; chin white. Ears very variable in size, their backs uniformly slaty flesh-color. Hands, feet, and sometimes fore-arms white. Greater part of soles naked, finely granulated, without distinct striated pads. Tail moderate, slender, not incrassated, brown above, gray or white below. Mammæ eight.

Dimensions.—Head and body about three and a half inches; tail about the same.

Habitat.—Australia south of the tropics.

References.—Thomas, B.M. Catal. p. 303, pl. xxiii. fig. 7 (*sole*); Gould, Mamm. Austr. i. pls. xli. (*S. fuliginosus*), xlii. (*S. Albipes*), xliii. (*S. murinus*).

3. Sminthopsis leucopus, *Gray, sp.* (1842).

White-footed Pouched Mouse.

Size medium; form slender. Fur close, fine, and straight. General color above uniform dark grayish-brown or mouse-color, with no prominent markings; below white. Ears large and broad, their backs uniform slaty-gray. Hands and feet pure white. Palms finely granulated with six pads. Soles finely hairy posteriorly, coarsely granulated anteriorly; the pads small, four in number, and finely striated transversely. Tail moderate, slender, shorter in southern than in extreme northern specimens, gray or brown above, white below. Mammæ ?

Dimensions.—Head and body about four inches; tail in southern examples about three and a half, in northern about four inches.

Habitat.—Eastern Australia from Cape York to Tasmania.

References.—Thomas, B.M. Catal. p. 302, pls. xxiii. figs. 5 *(ear)*, 6 *(sole)*, xxv. figs. 7 *(teeth)*, 8 and 9 *(skull)*; Gould, Mamm. Austr. i. pls. xxxv. *(S. leucopus)*, xxxvi. *(S. ferrugineifrons)*.

4. Sminthopsis virginiæ, *De Tarragon, sp.* (1847).

Striped-faced Pouched Mouse.

Size large. Fur rather short, very soft and silky. General color above grizzled gray; below white or pale yellow. Face sandy rufous, ornamented with a central and on each side a lateral black longitudinal line. Cheeks, sides of neck, and basal ear-tufts bright rufous. Ears very large and nearly naked. Outside of upper arms and thighs like the back; rest of limbs white. Sole-pads probably similar to those of *S. leucopus*. Tail short-haired, dark brown above, paler below. Mammæ ?

Dimensions.—Head and body about five inches; tail about the same.

Habitat.—Herbert River District, Queensland.

References.—Thomas, B.M. Catal. p. 300; Collett, P.Z.S. 1886, p. 548, pl. lx. *(animal, skull* and *teeth)*.

Genus IV.—PHASCOLOGALE, *Temminck*, (1827).

Body unspotted. Form slender and graceful. Ears rounded. Tail long, bushy, crested, or nearly naked. Feet broad and short. Toes subequal, with sharp, curved claws; hallux present, short and clawless. Soles naked, granulated, with five transversely-striated pads; the hallucal pad often divided into two. Pouch practically obsolete. Mammæ four, six, eight, or ten.

Dentition.—I. $\frac{1.2.3.4}{1.2.3}$, C. $\frac{1}{1}$, P. $\frac{1.0.3.4}{1.0.3.4}$, M. $\frac{1.2.3.4}{1.2.3.4} \times 2 = 46$.

Habits—Arboreal; insectivorous.

Note.—The fourth premolar is absent in *P. cristicaudata*.

1. Phascologale calura, *Gould*, (1844).

Lesser Brush-tailed Pouched Mouse.

Size medium; form slender. Fur long, soft, and fine. General color above gray with a faint rufous tinge; below white. Ears very large, almost naked, with well-marked basal tufts of red hair. Hands and feet white. Soles with five pads, the hallucal very long, but undivided; claws small and weak. Tail long; the basal half short-haired, rufous above, dark brown below; the terminal half black, and slightly bushy all round. Mammæ ?

Dimensions.—Head and body about five inches; tail about six inches.

Habitat.—South and West Australia.

References.—Thomas, B.M. Catal. p. 296, pls. xxiv. fig. 9 *(upper view of skull)*, xxv. fig. 6 *(teeth)*; Gould, Mamm. Austr. i. pl. xxxii.

2. Phascologale penicillata, *Shaw, sp.* (1800).

Greater Brush-tailed Pouched Mouse.

Size large; form stout and strong. Fur short and coarse. General color above finely grizzled pale gray; below, chin white, chest, belly, and innerside of limbs white or pale gray, the pouch-hairs dull rufous. Muzzle with an indistinct darker stripe. Ears very large, nearly naked. Feet and hands gray. Soles with the five primary pads very long, the hallucal pad undivided, and a minute supplementary pad posteriorly on the outer margin; claws long and strong. Tail long and thick, the terminal half or three-fifths thickly clothed all round with long black hairs, forming a prominent brush. Mammæ ten.

Dimensions.—Head and body about ten inches; tail about nine inches.

Habitat.—All Australia, except the extreme North.

References.—Thomas, B.M. Catal. p. 294, pls. xxiii. fig. 4 (*sole*), xxiv. fig. 4 (*teeth*); Gould, Mamm. Austr. i. pl. xxxi.

3. Phascologale minutissima, *Gould, sp.* (1851).

Pigmy Pouched Mouse.

Size very small. Fur short, soft, and fine, mainly composed of underfur. General color above finely grizzled mouse-gray; below, chin white, chest and belly similar to, but paler than back. Ears of medium size, thinly clothed with short hairs. Hands and feet pale brown. Soles naked, with seven pads. Tail of moderate length, short-haired. Pouch fairly developed. Mammæ eight.

Dimensions.—Head and body about three inches; tail about two and a half inches.

Habitat.—Central and Southern Queensland.

References.—Thomas, B.M. Catal. p. 292, pls. xxiv. fig. 8 (*upper view of skull*), xxv. fig. 3 (*teeth*); Gould, Mamm. Austr. i. pls. xliv. (*P. maculata*), xlv. (*P. minutissima*).

4. Phascologale flavipes, *Waterhouse* (1837).

Yellow-footed Pouched Mouse.

Size small or medium; form stout. Fur close and rather crisp. General color above gray suffused with yellow or rufous; below yellow or rufous. Ears rather large, naked above, their bases tufted externally with yellow or gray. Limbs and feet more or less like the belly. Soles naked, with six pads, the hallucal usually divided. Claws small and delicate. Tail short-haired, brown or yellow above, paler below, the terminal inch sometimes black. Mammæ eight.

Dimensions.—Head and body about five inches; tail about three and a half inches.

Habitat.—From New Guinea throughout Eastern Australia to South Australia.

References.—Thomas, B.M. Catal. p. 289, pl. xxv. fig. 5 (*teeth*); Gould, Mamm. Austr. i. pls. xl. (*P. flavipes*), xxxvii. (*P. unicolor*).

4a. P. flavipes var. leucogaster, *Gray* (1841).

White-bellied Pouched Mouse.

Differs from the typical form only in the underside and limbs being white.

Habitat.—Northern and Western Australia.

References.—Thomas, B. M. Catal. p. 291; Gould, Mamm. Austr. i. pl. xxxviii.

5. Phascologale minima, *Geoffroy, sp.* (1804).

Little Pouched Mouse.

Size medium; form murine. Fur thick and close, but rather harsh. General color above gray, suffused with yellow or rufous, more strongly posteriorly; below, chin white, chest and belly dirty yellowish-gray. Ears short, nearly naked, generally tufted at the base. A yellow patch on the front and outside of the hips. Hands and feet gray, yellow, or brown. Soles naked, with five pads, but the hallucal sometimes divided. Claws very long and strong. Tail short, closely short-haired, brown above, paler below. Mammæ?

Dimensions.—Head and body about five and a half inches; tail about three and a half inches.

Habitat.—Tasmania and the adjoining Islands.

References.—Thomas, B.M. Catal. p. 287.

6. Phascologale swainsoni, *Waterhouse* (1840).

Swainson's Pouched Mouse.

Size medium. Fur very long, soft, and thick. General color above deep rufous- or umber-brown, below dull brownish-gray. Muzzle long. Ears short and broad, covered with short dark brown hairs. Hands and feet dark brown. Soles with five pads, the hallux not, or scarcely divided. Fore claws very long and strong. Tail moderate, short-haired, uniformly dark brown. Mammæ probably ten.

Dimensions.—Head and body about five inches; tail about four inches.

Habitat.—Tasmania; South-east Victoria.

References.—Thomas, B.M. Catal. p. 285, pls. xxiv. fig. 7 (*upper view of skull*), xxv. fig. 4 (*teeth*); Gould, Mamm. Austr. i. pl. xxxiv.

7. Phascologale apicalis, *Gray* (1842.

Freckled Pouched Mouse.

Size medium. Fur coarse. General color above freckled reddish-gray, below dull white or yellowish. A whitish ring round the eye. Ears short and rounded, clothed inside and outside with short gray hairs. Front and outside of fore-arm rufous; rest of outsides of limbs dull gray. Hands and feet gray. Soles granulated; hallucal pad rarely subdivided. Tail short, hairy, colored above like the back, below gray or yellowish-gray; the extreme tip black. Mammæ eight.

Dimensions.—Head and body about five inches; tail about three and a half inches.

Habitat.—West and probably North Australia.

References.—Thomas, B.M. Catal. p. 277, pls. xxiv. fig. 5 (*upper view of skull*), xxv. fig. 1 (teeth); Gould, Mamm. Austr. i. pl. xxxix.

8. Phascologale cristicaudata, *Krefft, sp.* (1866).

Krefft's Pouched Mouse.

Size medium. Fur close and soft. General color above sandy-brown, below paler. Ears short, rounded, and very broad. Tail short, a prominent crest of black hairs, becoming longer towards the tip, on the upper side of its terminal half. Mammæ?

Dimensions.—Head and body about five inches; tail about three and a half inches.

Habitat.—South Australia.

Type.—In the Australian Museum, Sydney.

References.—Thomas, B.M. Catal. p. 276; Krefft, P.Z.S. 1866, p. 435, pl. xxxvi.

Note.—As the only specimen known is mounted, it is impossible to give any description of the palms and soles and their pads. In the type specimen, according to Krefft, the fourth premolar is absent, but seeing that it is present in all other members of the subfamily (except *P. thorbeckiana*, in which it is a variable character), this is doubtless an individual variation or peculiarity.

Genus V.—DASYURUS, *E. Geoffroy* (1796).

Body spotted. Form stout or slender, graceful. Ears long and narrow. Tail long, evenly- and thickly-haired throughout. Feet plantigrade. Toes subequal, with sharp, curved claws; hallux very small or wanting. Soles granulated, nearly or wholly naked. Pouch opening vertically downwards. Mammæ six or eight.

Dentition.—I. $\frac{1.2.3.4}{1.2.3}$, C. $\frac{1}{1}$, P. $\frac{1.0.3.0}{1.0.3.0}$, M. $\frac{1.2.3.4}{1.2.3.4} \times 2 = 42$.

Habits.—Terrestrial and arboreal; carnivorous and insectivorous.

Note.—The "Native Cats" of the Australian region take the place of the *Mustelidæ* of the palæ- and ne-arctic regions, and are equally destructive to poultry &c.

1. Dasyurus hallucatus, *Gould* (1842).

North-Australian Native Cat.

Size small; form slender. Fur short and coarse. General color above yellowish-brown spotted with white; below pale gray or yellow. Ears large, thinly clothed with fine yellow hairs. *Hallux present.* Sole-pads smooth, well-defined, and transversely striated. Tail long, rather short-haired, its base colored like the body, but unspotted, the remainder black. Mammæ eight.

Dimensions.—Head and body about eleven inches; tail about eight inches.

Habitat.—Tropical Australia.

References.—Thomas, B.M. Catal. p. 269; Gould, Mamm. Austr. i. pl. lii.

2. Dasyurus geoffroyi, *Gould* (1840).

Black-tailed Native Cat.

Size medium; form slender. Fur thick and soft. General color above olive-gray tinged with rufous and spotted with white; below white. Ears large, their backs brown with white margins. *Hallux present.* Soles granulated, the pads marked by rounded unstriated prominences. Tail long and rather bushy, the basal half above and fourth below colored like the back, but unspotted, the remainder black. Mammæ six.

Dimensions.—Head and body about sixteen inches; tail about twelve inches.

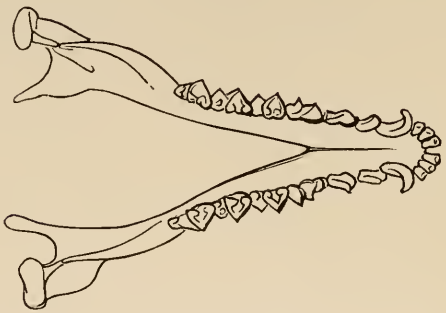
Habitat.—All Australia except the extreme North, and the coastal districts of the South-East.

References.—Thomas, B.M. Catal. p. 268, pl. xxiii. figs. 1 (*ear*), 2 (*sole*); Gould, Mamm. Austr. i. pl. li.

3. Dasyurus viverrinus, *Shaw, sp.* (1800).

Common Native Cat.

Fig. 1.



Lower jaw of *Dasyurus viverrinus*, showing typical polyprotodont dentition (natural size).

Size medium; form slender. Fur thick and soft. General color above and below either pale gray or black, spotted with white. Ears large. *Hallux absent.* Soles granulated, without distinct pads. Tail bushy, its proximal three-fourths like the back, but unspotted, its tip white. Mammæ six.

Dimensions.—Head and body about eighteen inches; tail about twelve inches.

Habitat.—Eastern watershed of New South Wales; Victoria; South Australia; Tasmania.

References.—Thomas, B. M. Catal. p. 265; Gould, Mamm. Austr. i. pl. l.

Note.—This species, in both varieties, but mostly in the light-colored form, is as much, if not more, terrestrial than arboreal, living in dead logs under rocks, or in holes in the cliffs, in which latter place they feed on dead fish, and probably crustaceans, mollusks, &c., and are thus frequently caught in baited fish-traps left bare by the tide or hauled up during bad weather. Fossil remains of this species have been discovered in the Wellington Caves, New South Wales, the Pleistocene Deposits of Gowrie, Queensland, and in Tasmania.

4. Dasyurus gracilis, *Ramsay* (1888).

Slender Native Cat.

Size small; form light and graceful. Fur short, close, and somewhat harsh to the touch. General color above and below deep blackish-brown, spotted with white, the spots on the sides and on the basal third of the tail largest and sometimes confluent. Ears rather short, thinly haired proximally outside, the inside with a tuft of long hairs on the anterior margin. *Hallux present.* Claws long and powerful. Tail long, slender, the terminal inch tufted, colored like the body. Mammæ?

Dimensions.—Head and body thirteen inches; tail nine and a half inches.

Habitat.—Bellenden-Ker Range, Northern Queensland.

Type.—In the Australian Museum, Sydney.

Reference.—Ramsay, P.L.S. N.S. Wales, (2) iii. p. 1296 (1888).

Note.—Were it not for the indisputably adult dentition of the unique specimen on which Dr. Ramsay has founded his new species, and that evidence, presumably reliable, points to the existence *in the same district* of a Spotted-tailed Dasyure as large as or even larger than the southern *D. maculatus*, I should have been inclined to consider this specimen as merely an aborted tropical form of that species; until, however, further research has undeniably proved the presence there of two so widely separated races it is perhaps better to keep them apart. It is worth mentioning that both in its fauna and flora the Bellenden-Ker Ranges shew more distinct affinities to the Papuan than to the restricted Australian Subregion; for instance the Rhododendron flourishes in a wild state in these mountains only of Australia, having evidently travelled round from the Himalayas along the highlands of New Guinea, and so down the northern Queensland Ranges; similarly such typical Papuan forms as *Dendrolagus* among Mammals, *Casuarius* among Birds, *Papuina* among Molluscs, *Perichæta* among Earthworms, with many others, have found their way into our fauna.

5. Dasyurus maculatus, *Kerr, sp.* (1792).

Spotted-tailed Native Cat.

Size large; form stout and heavy. Fur thick and close. General color above dark brown with a rufous or orange tinge, but never black, with large white spots; below white or pale yellow. Ears rather short and very thinly haired. *Hallux present.* Claws large and powerful. Tail very long, brown or rufous brown, spotted like the body. Mammæ six.

Dimensions.—Head and body about twenty-five inches; tail about nineteen inches.

Habitat.—From Central Queensland to Victoria, principally on the Ranges but extending to the coast line; Tasmania.

References.—Thomas, B.M. Catal. p. 263, pl. xxiv. fig. 3 (*right molar*^{3}); Gould, Mamm. Austr. i. pl. xlix.

It seems to me that there must have been some extraordinary misapprehension on the part of Mr. Thomas, or some misrepresentation on the part of his correspondents, when he penned the sentence (*loc. cit.* p. 265) asserting the "great rarity on the continent"—i.e. the mainland of Australia—of this species in comparison with its "commoness in Tasmania;" as a matter of fact *D. maculatus* is by no means uncommon—nor seemingly has it any present intention of dying out—in the mountainous and coastal districts of eastern Australia from northern Queensland, through New South Wales and Victoria to South, and possibly West Australia. It may be worth mentioning that the largest, stoutest, and heaviest example I have yet seen was caught, in company with five others, on Manly Beach, a suburb of Sydney. For these and other reasons I cannot in any wise agree with Mr. Thomas as to the approaching extermination of this species on the mainland, nor can I allow, though confessedly unable to promulgate a more ostensible theory, that the causes which conduced to the annihilation, at what must have been a very recent period, of *Sarcophilus* and *Thylacinus* from Eastern Australia, can have in any degree affected *D. maculatus*, the former having been purely, or at the least mainly terrestrial, while the latter is most emphatically an arboreal Mammal. If the Dingo, as suggested by Mr. Thomas, had anything whatever to do with the extermination of our Native Cats, the first to disappear would have been *D. viverrinus* by far the most terrestrial of all the Dasyures.

Genus VI.—SARCOPHILUS, *F. Cuvier* (1837).

Body blotched with white. Form very stout and powerful. Muzzle short and broad. Ears broad and rounded. Tail moderate, evenly hairy. Feet plantigrade. Toes subequal, with well-developed curved claws; hallux absent. Soles naked, without defined pads.

Dentition.—I. $\frac{1.2.3.4}{1.2.3}$, C $\frac{1}{1}$, P. $\frac{1.0.3.0}{1.0.3.0}$, M. $\frac{1.2.3.4}{1.2.3.4} \times 2 = 42$.

Habits.—Fossorial; carnivorous.

Note.—A fossil species, *S. laniarius*, Owen, sp., is found in the Wellington Caves and at Gowrie, Queensland.

1. Sarcophilus ursinus, *Harris, sp.* (1808).

Tasmanian Devil.

Fur thick and close, consisting largely of soft woolly underfur. General color above and below black or blackish-brown, with a

variable number of white patches on the neck, shoulders, rump, and chest, the pectoral patch only being constant. Ears hairy, with well-marked basal tufts. Soles naked, coarsely granulated, and without pads; a small transversely-striated pad at the extreme tip of each toe. Tail short, uniformly thickly hairy. Mammæ ?

Dimensions.—Head and body about twenty-eight inches; tail about twelve inches.

Habitat.—Tasmania.

References.—Thomas, B.M. Catal. p. 259, pl. xxiv. fig. 2 (*right molar*^{3}); Gould, Mamm. Austr. i. pl. xlviii.

Genus VII.—THYLACINUS, *Temminck* (1827).

Back transversely banded with black. Size large; form wolf-like. Muzzle long and slender. Ears of medium size. Tail well developed, short-haired. Feet markedly digitigrade. Toes subequal, with short, thick, conical claws. Hallux absent. Pouch opening backwards. Mammæ four. Marsupial bones rudimentary.

Dentition.—I. $\frac{1.2.3.4}{1.2.3}$, C. $\frac{1}{1}$, P. $\frac{1.0.3.4}{1.0.3.4}$, M. $\frac{1.2.3.4}{1.2.3.4} \times 2 = 46$

Habits.—Terrestrial; carnivorous.

Note.—*Thylacinus spelæus*, Owen, a fossil form of larger size than the living representative is also known from the Wellington Caves and the Queensland Pleistocene.

1. Thylacinus cynocephalus, *Harris, sp.* (1808).

Tasmanian Wolf.

Fur short, close, and crisp. General color above pale finely grizzled gray-brown, with a faint yellowish or tawny tinge; below slightly paler. Round the eyes, edges and base of the ears nearly white. Posterior part of back with about sixteen blackish-brown transverse bands, descending on the rump nearly to the knee. Soles naked, coarsely granulated, without defined pads. Tail with indistinct crests above and below, its tip blackish.

Dimensions.—Head and body about forty-four inches; tail about twenty-one inches.

Habitat.—Tasmania.

References.—Thomas, B.M. Catal. p. 255, pl. xxiv. fig. 1 (*right molar*^{3}); Gould, Mamm. Austr. i. pls. liii. (*head*), liv.

Family II.—PERAMELIDÆ.

Bandicoots.

Hind limbs decidedly the longer. Fore feet with two or generally three of the middle digits long, and clawed, the others rudi-

mentary or absent. Hind feet syndactylous, with four or five toes very unequal in size; hallux rudimentary or absent; second and third toes slender, united; fourth strongest, long, with a large claw; fifth present, clawed. Clavicles absent. Cœcum present. Pouch present, opening backwards.

Genus I.—CHŒROPUS, *W. Ogilby* (1838).

Form light and slender. Muzzle short and narrow. Ears long and narrow. Fore feet with the first and fifth digits absent, the fourth rudimentary, the second and third fully developed with long, slender claws. Hind feet with the hallux absent, the fifth toe rudimentary, and the fourth very large. Tail cylindrical, slightly crested along the upper surface. Mammæ eight.

Dentition.—I. $\frac{1.2.3.4.5}{1.2.3}$, C. $\frac{1}{1}$, P. $\frac{1.0.3.4}{1.0.3.4}$, M. $\frac{1.2.3.4}{1.2.3.4} \times 2 = 48$.

Habits.—Terrestrial; fossorial; omnivorous.

1. Chœropus castanotis, *Gray* (1842).

Pig-footed Bandicoot.

Size small; form delicate. Fur coarse and straight, but not spiny. Ears thinly haired, dull chestnut-brown behind, darkening towards the tip. General color above coarse grizzled gray with a tinge of fawn; below white. Limbs long and slender. Tail short, black above, gray on the sides and below.

Dimensions.—Head and body about ten inches; tail about four inches.

Habitat.—Western New South Wales and Victoria; South and West Australia; (Northern Territory ?).

Type.—In the Australian Museum, Sydney.

References.—Thomas, B. M. Catal. p. 250; Gould, Mamm. Austr. i. pl. vi.

Genus II.—PERAMELES, *Geoffroy* (1803).

Form varying from stout and clumsy to light and delicate. Muzzle long and pig-like. Ears variable in size. Fore feet with the first and fifth digits short and clawless, and the three middle digits long and subequal with curved fossorial claws. Hind feet with the hallux short and clawless, the second and third toes with flat twisted nails, the fourth long and powerful with a stout pointed claw, and the fifth similar but smaller. Tail tapering; short-haired or nearly naked. Mammæ six or eight.

Dentition.—I $\frac{1.2.3.4.5 \text{ or } 0}{1.2.3.}$, C. $\frac{1}{1}$, P. $\frac{1.0.3.4}{1.0.3.4}$, M. $\frac{1.2.3.4}{1.2.3.4} \times 2 = 46$ or 48.

Habits.—Terrestrial; fossorial; omnivorous.

Note.—The Bandicoots do a great amount of damage to cultivated lands and gardens, not only by digging up and consuming

large quantities of the seeds, roots, and bulbs planted by the farmers, but also by being the especial enemy of earth-worms, which by their constant and equable trituration of the soil, and their introduction below the surface by means of their excreta of such foreign substances as decaying leaves, &c., are generally accepted now as most potent friends of agriculture. These animals fall naturally into two very distinct groups, the former of which, represented by *P. gunni* and its allies, inhabits the "stony ridges of the hotter and more exposed parts," while the latter, represented by *P. obesula* and its allies, is restricted to "low swampy grounds covered with dense vegetation."

From the Caves of the Wellington Valley, N.S. Wales, numerous remains of Bandicoots have been secured in a fossil state, but agreeing so intimately with recent forms as to make it injudicious to separate them; the species represented are as follows: *Perameles bougainvillii*, *P. nasuta*, *P. obesula*, an undescribed species of *Perameles* and *Peragale lagotis*.

1. Perameles bougainvillii, *Quoy & Gaimard* (1824).

Western Striped Bandicoot.

Size small; form light and delicate. Fur coarse, but not spinous. Muzzle long and slender. Ears long, narrow, and pointed, reaching when laid forward beyond the eye; their backs grayish-flesh-color, slightly darker on the anterior portion of their terminal half. General color above grizzled olive-gray; below white; sides of rump with ill-defined stripes. Soles hairy and black posteriorly; naked, granulated, and flesh-colored anteriorly; conspicuous round pads at bases of fourth and fifth toes. Tail moderate, brown above, white below. Mammæ eight.

Dimensions.—Head and body about nine inches; tail about four and a quarter inches.

Habitat.—West Australia.

References.—Thomas, B.M. Catal. p. 246, pl. xxi. figs. 7 (*ear*), 8 (*sole*); Gould, Mamm. Austr. i. pl. x.

1a. P. bougainvillii, var. fasciata, *Gray* (1841).

Eastern Striped Bandicoot.

Differs from the typical form only in the stronger contrast between the dark and light patches on the back of the ears, and in the rump-stripes being well defined and conspicuous.

Habitat.—South-eastern and southern Australia.

References.—Thomas, B. M. Catal. p. 248; Gould, Mamm. Austr. i. pl. viii.

2. Perameles gunni, *Gray* (1838).

Tasmanian Striped Bandicoot.

Size large; form slender. Fur soft, not spinous. Muzzle long and slender. Ears long and pointed, reaching when laid forward beyond the eye; their backs yellowish-brown, with a darker blotch on the anterior portion of their terminal half. General color above grizzled yellowish-brown; below white or yellowish-white; sides of rump with four vertical light bands. Soles hairy and black posteriorly, naked and white anteriorly; small round striated pads at bases of fourth and fifth toes. Tail very short, slender, white except on a short basal portion of the upper surface. Mammæ ?

Dimensions.—Head and body about sixteen inches; tail less than four inches.

Habitat.—Tasmania, and probably the coastal region of South-eastern Victoria.

References.—Thomas, B. M. Catal. p. 245; Gould, Mamm. Austr. i. pl. ix.

3. Perameles nasuta, *Geoffroy* (1804).

Long-nosed Bandicoot.

Size large; form slender. Fur coarse, hispid, and slightly spinous. Muzzle very long and slender. General color above dull olivaceous-brown; below white. Ears long, narrow, and pointed. Inner side of limbs and feet white. Soles granulated, black and thinly hairy posteriorly, white and naked anteriorly. Tail of moderate length, brown above, paler below. Mammæ ?

Dimensions.—Head and body about sixteen inches; tail abou five inches.

Habitat.—Eastern Australia.

References.—Thomas, B. M. Catal. p. 242, pl. xxii. figs. 5 & 6 (*skull*); Gould, Mamm. Austr. i. pl. xi.

4. Perameles macrura, *Gould* (1842).

North Australian Bandicoot.

Size large; form rather stout. Fur short, coarse, and spiny. General color above coarsely grizzled yellow and black; below white or yellowish-white. Ears short and broad, their backs brown, narrowly margined with white. Hands and feet brown, or mixed brown and white. Soles naked and coarsely wrinkled. Tail rather long, brown above, white below. Mammæ eight.

Dimensions.—Head and body about sixteen inches; tail about seven inches.

Habitat.—Northern Australia.

References.—Thomas, B.M. Catal. p. 234.

5. Perameles aurata, *Ramsay* (1887).

Golden Bandicoot.

Size small; form rather stout. Fur coarse and spiny. General color above rich golden brown pencilled with black; below white. Ears short and broad.

Dimensions.—Head and body about eight and a half inches.

Habitat.—North-western Australia.

Type.—In the Macleay Museum, Sydney University.

Reference.—Ramsay, P.L.S., N.S. Wales (2) ii. p. 551 (1887).

6. Perameles obesula, *Shaw, sp.* (1793).

Short-nosed Bandicoot.

Size medium; form stout. In all other respects externally resembling the *P. macrura*, except that the tail is shorter, the feet rather less heavy, and the general color lighter.

Dimensions.—Head and body about fourteen inches; tail about five and a half inches.

Habitat.—Australia south of the tropics; Tasmania.

References.—Thomas, B.M. Catal. p. 231, pl. xxi. fig. 5 (*ear*); Gould, Mamm. Austr. i. pl. xii.

Genus III.—PERAGALE, *Gray* (1841).

Form light and delicate. Muzzle long and narrow. Ears very long. Fore feet with the first and fifth toes rudimentary and clawless, and the three middle toes long, with powerful curved claws. Hind limbs much longer than the fore. Hallux absent externally. Soles hairy. Tail long, conspicuously crested on the terminal half above.

Dentition.—I. $\frac{1.2.3.4.5}{1.2.3}$, C. $\frac{1}{1}$, P. $\frac{1.0.3.4}{1.0.3.4}$, M. $\frac{1.2.3.4}{1.2.3.4} \times 2 = 48$.

Habits.—Terrestrial; fossorial; omnivorous.

1. Peragale leucura, *Thomas* (1887).

White-tailed Rabbit-Bandicoot.

Size small; form slender. Fur long, soft, and silky. General color above pale yellowish-fawn; below white. Ears thinly clothed with fine silvery hairs. Limbs white. Greater part of the soles hairy. Tail moderate, slender, tapering, short-haired except on the terminal third above, uniform white.

Dimensions.—Of adult unknown.

Habitat.—Unknown; probably Central or North-Central Australia.

References.—Thomas, B.M. Catal. p. 225, pls. ii., xxi. figs. 9 (*palm*), 10 (*sole*).

2. Peragale lagotis, *Reid, sp.* (1836).

Common Rabbit-Bandicoot.

Size large; form light and delicate. Fur very long, soft, and silky. General color above fawn-gray; below white. Cheeks and bases of ears white or pale fawn. Ears nearly naked, their edges and the anterior part of the backs thinly clothed with pale brown hairs. An indistinct darker vertical band on the sides of the rump. Outer sides of the fore and backs of the hind limbs dark gray grizzled with white; remainder of limbs white. Soles almost entirely thickly hairy. Tail of moderate length, thickly hairy throughout, the basal third colored like the body, the middle third black or dark brown, the terminal third white and prominently crested above.

Dimensions.—Head and body about eighteen inches; tail about nine inches.

Habitat.—South and West Australia.

References.—Thomas, B. M. Catal. p. 223, pl. xxii. fig. 1 *(skull)*; Gould, Mamm. Austr. i. pl. vii.

Suborder II.—Diprotodontia.

Normal characters.—Incisors three in the upper, one in the lower jaw, the latter long and powerful. Canines usually small, much smaller than the incisors, almost invariably absent below. Molars bluntly tuberculate or ridged.

Frugivorous, graminivorous, phytophagous, herbivorous, rhizophagous; rarely insectivorous and mellivorous.

Exceptions.—One upper incisor only in each ramus in *Phascolomys;* second lower incisor present in *Phalanger*, *Trichosurus*, *Gymnobelideus*, *Dromicia*, *Distæchurus*, and *Acrobates;* occasionally in *Pseudochirus* and *Petauroides;* second and third in *Dactylopsila;* second and occasionally third in *Petaurus.*

Family III.—PHASCOLOMYIDÆ.

Wombats.

Form stout and clumsy. Muzzle short and broad. Limbs subequal, very thick and strong. Fore feet with five subequal digits, each with a stout claw. Hind feet with the hallux short and clawless; the other toes with long, curved claws; the second and third with a slight tendency to syndactyly. Tail rudimentary. Stomach simple. Cœcum present. Pouch present. Mammæ?

Genus I.—PHASCOLOMYS, *E. Geoffroy* (1803).

Characters as those of the family.

Dentition.—I. $\frac{1.0.0}{1.0.0}$, C. $\frac{0}{0}$, P. $\frac{0.0.0.4}{0.0.0.4}$, M. $\frac{1.2.3.4}{1.2.3.4}$ × 2 = 24.
Habits.—Fossorial; rhizophagous.

1. Phascolomys mitchelli, *Owen* (1838).

Common Australian Wombat.

Size large. Rhinarium large, naked, and black. Fur coarse, harsh, and hispid. Color above and below either yellow, grizzled yellow and black, or black. Ears short, rounded, and well-haired. Ribs of the exceptional number of fifteen.

Dimensions.—Head and body about forty-four inches.

Habitat.—New South Wales, Victoria, and South Australia.

References.—Thomas, B. M. Catal. p. 213; Gould, Mamm. Austr. i. pls. lvii. (*head*), lviii.

2. Phascolomys ursinus, *Shaw, sp.* (1800).

Tasmanian Wombat.

Differs in no respect from the preceding except in its smaller size. Color above and below uniform dark grizzled grayish-brown.

Dimensions.—Head and body about thirty-eight inches.

Habitat.—Tasmania, and Islands in Bass' Straits.

References.—Thomas, B. M. Catal. p. 215; Gould, Mamm. Austr. i. pls. lv. (*head*), lvi.

3. Phascolomys latifrons, *Owen* (1845)

Hairy-nosed Wombat.

Size moderate. Rhinarium hairy, velvety to the touch, and white. Fur straight, soft, and silky. General color above mottled gray; tip of muzzle, a spot above and below the eyes, cheeks, throat, and chest white; chin black; rest of underside dirty gray. Ears comparatively long, narrow, and pointed; outwardly sparsely clothed with black hairs, inwardly naked. Ribs of the normal number of thirteen.

Dimensions.—Head and body about forty inches.

Habitat.—South Australia.

References.—Thomas, B. M. Catal. p. 217; Gould, Mamm. Austr. i. pls. lix. (*head*), lx.

Family IV.—PHALANGERIDÆ.

All the feet with five digits, those of the fore limbs generally subequal; those of the hind limbs syndactylous, fairly stout and well developed; fourth toe the longest, the fifth but little smaller;

hallux present, large, widely opposable, with a broad, nailless, terminal pad. Tail (except in *Phascolarctus*) very long, and almost always prehensile. Stomach simple. Cœcum present (except in *Tarsipes*). Pouch well developed, opening backwards.

Subfamily I.—Phascolarctinæ.

Tail wanting. Muzzle short and broad. Tongue not extensile. Cheek-pouches present. Cœcum large and complicated. Teeth large.

Genus I.—PHASCOLARCTUS, *Blainville* (1816).

Size large ; form very stout and clumsy. Fur thick and woolly. Ears large, thickly furred. Flanks without flying-membrane. Fore toes subequal, their lengths in the following relative order—4, 3, 5, 2, 1 ; the first and second opposable to the others. Claws thick, strong, and sharply pointed. Palms and soles granulated without striated pads. Tail rudimentary. Mammæ two. Ribs numbering eleven only.

Dentition.—I. $\frac{1.2.3}{1.0.0}$, C. $\frac{1}{0}$, P. $\frac{0.0.0.4}{0.0.0.4}$, M. $\frac{1.2.3.4}{1.2.3.4} \times 2 = 30$.

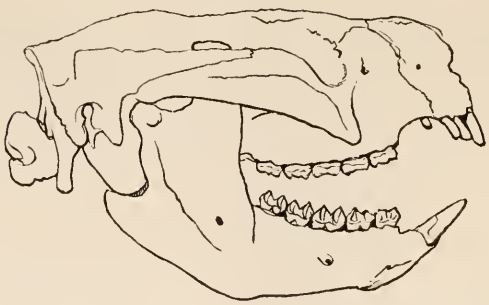
Habits.—Arboreal ; phytophagous.

Note.—A fifth lower molar is occasionally developed.

1. Phascolarctus cinereus, *Goldf., sp.* (1819).

Koala ; Native Bear.

Fig. 2.



Side view of skull of *Phascolarctus cinereus,* reduced one half.

General color above gray ; below white or yellowish-white. Rhinarium thinly clothed with minute hairs. Ears rounded, the hairs on their backs black tipped with white ; elsewhere white. rump dirty yellowish-white, sometimes irregularly spotted. Hands and feet white.

Dimensions.—Head and body about thirty-two inches.

Habitat.—Eastern Australia.

References.—Thomas, B. M. Catal. p. 210; Gould, Mamm. Austr. i. pls. xiii. (*head*), xiv.

Subfamily II.—Phalangerinæ.

Australian Opossums.

Tail well developed, generally prehensile. Muzzle short and broad. Tongue not extensile. No cheek-pouches. Cœcum present, large. Stomach simple. Teeth large.

Genus II.—PHALANGER, *Storr* (1780).

Size large or medium; form stout. Fur thick and woolly. Ears medium or short. Flanks without flying-membrane. Fore toes subequal, their lengths in the following relative order—4, 3, 5, 2, 1. Claws long, stout, and curved. Soles naked, striated; pads large and ill-defined. Tail strong, its terminal portion naked all round, smooth or granulated, prehensile. Mammæ four.

Dentition.—I. $\frac{1.2.3}{1.2.0}$, C. $\frac{1}{0}$, P. $\frac{1\ 0\ 3.4}{1.0.3.4}$, M. $\frac{1.2.3.4}{1.2.3.4} = 16 + 4 \times 2 = 40$.

Habits.—Arboreal; phytophagous.

1. Phalanger maculatus, *E. Geoffroy, sp.* (1803).

Spotted Cuscus.

Size large. Fur soft. Top of muzzle above rhinarium thinly haired. Ears small, thinly clothed both inside and outside with soft woolly hair. General colors above various combinations of white, rufous, and black; below white tinged with yellow or rufous. Tail generally deep yellow, furry from one-half to three-fourths of its length above, and from one-third to one-half below.

Dimensions.—Head and body about twenty-six inches; tail about nineteen inches.

Habitat.—Northern Australia (Cape York District); Southern New Guinea; Austro-Malayan subregion from Saleyer eastward.

References.—Thomas, B. M. Catal. p. 197, pl. xxi. fig. 2 *(ear)*; Gould, Mamm. Austr. i. pl. xxi. (♀).

Genus III.—TRICHOSURUS, *Lesson* (1828).

Size large; form stout. Fur thick and woolly. Ears medium or short. Flanks without flying membrane. Fore toes subequal, their lengths in the following relative order—4, 3, 2, 5, 1. Claws large and strong. Soles thickly hairy under the heels; the rest naked, with low rounded ill-defined pads. Tail strong, its

terminal third or half naked beneath; its extreme tip naked all round. A gland on the chest. Mammæ?

Dentition.—I. $\frac{1.2.3}{1.2.0}$, C. $\frac{1}{0}$, P. $\frac{1.0.0.4}{0.0.3.4}$, M. $\frac{1.2.3.4}{1.2.3.4}$ = (at most) 16 + 2 × 2 = 36.

Habits.—Arboreal; phytophagous.

1. Trichosurus caninus, *W. Ogilby, sp.* (1835).

Short-eared Opossum.

Size large. Fur comparatively short. Ears short, evenly rounded, not so long as broad. General color above clear grizzled gray or deep umber-brown with a rufous tinge, paler on the forequarters, sides, and below, darker along the posterior back. Tail very thick and bushy, nearly wholly black.

Dimensions.—Head and body about twenty-two inches; tail about fifteen inches.

Habitat.—New South Wales; Southern Queensland.

References.—Thomas, B. M. Catal. p. 191; Gould, Mamm. Austr. i. pl. xvii.

2. Trichosurus vulpecula, *Kerr, sp.* (1792).

Common Opossum.

Size small. Fur close, thick, and woolly. General color above clear grizzled gray; below, chin more or less blackish; throat, chest, and belly white or dirty yellow; a median chest-patch in adults rusty red. Ears long and narrow, much longer than broad, nearly naked inside and terminally outside. Hands and feet white, gray, or brown. Tail thick, cylindrical, and bushy, terminal half or two-thirds gray, its end black; the extreme tip occasionally white, the naked part below transversely wrinkled, from three to six inches in extent.

Dimensions.—Head and body about eighteen inches; tail about eleven inches.

Habitat.—All Australia except the Cape York District.

References.—Thomas, B. M. Catal. p. 187; Gould, Mamm. Austr. i. pl. xvi.

Note.—The *Phalangista johnstonii* of Dr. Ramsay is now considered by its author as a larger and more brightly colored local variety of *T. vulpecula*.

T. vulpecula, var. fuliginosus, *W. Ogilby, sp.* (1831).

Tasmanian Opossum.

Size larger, and form stouter and heavier than in the typical form. Fur longer and thicker. General color rufous-gray or deep umber-brown. Ears with little or no white behind. Tail very thick and bushy, almost wholly black.

Dimensions.—Head and body about twenty-three inches ; tail about fifteen inches.

Habitat.—Tasmania.

References.—Thomas, B. M. Catal. p. 190 ; Gould, Mamm. Austr. i. pl. xv.

Genus IV.—PSEUDOCHIRUS, *W. Ogilby* (1836).

Size large or medium. Fur short and rather woolly. Ears medium or short, hairy behind. Flanks without flying membrane. Fore toes subequal, the two inner ones markedly opposable to the outer three, their relative lengths as follows—4, 3, 5, 2, 1. Claws moderate. Palms and soles naked, with large rounded and striated pads. Tail long and tapering ; its tip naked underneath for a varying distance; markedly prehensile. Mammæ four.

Dentition.—I. $\frac{1.2.3 \text{ or } 0}{1.2.0}$, C. $\frac{1 \text{ or } 0}{0}$, P. $\frac{1.0.3.4}{1.0.3.4}$ M. $\frac{1.2.3.4}{1.2.3.4} = 15$ or $17+$ (at most) $3 \times 2 = 36$ or 40.

Habits.—Arboreal ; phytophagous.

1. Pseudochirus archeri, *Collett, sp.* (1884).

Archer's Opossum. 'Tula' of the Aborigines.

Size moderate. Fur soft, close, and thick. General color above grizzled grayish-green ; below, chin grayish-white, remainder pure white. A distinct pale yellow spot both above and below the eyes. Ears very short, broader than long, rounded, their posterior edges and a spot beneath their bases white. A black central line on the nape and back ; two indistinctly dark-edged whitish lines bordering the central line. Distal third of tail white. Naked part beneath tip less than half the length of tail.

Dimensions.—Head and body about fourteen inches ; tail about thirteen inches.

Habitat.—Herbert River District, Queensland.

References.—Thomas, B.M. Catal. p. 177 ; Collett, P.Z.S. 1884, p. 381, pl. xxix.

2. Pseudochirus cooki, *Desmarest, sp.* (1817).

Tasmanian Ring-tailed Opossum.

Size moderate. Fur very thick, close, and woolly. General color above dark smoky-brown ; below white. Ears large, rounded, the anterior part of the back brown, the posterior margin generally white. Hands and feet dark brown or black. Tail dark brown, the distal two to four inches white ; the naked part below smooth, from three to five inches long.

Dimensions. – Body and head about fourteen inches, tail nearly the same length.

Habitat.—Tasmania.

References.—Thomas, B. M. Catal. p. 176, pls. xviii. fig. 7 *(jaws)*; xix. fig. 4 *(upper view of skull)*; Gould, Mamm. Austr. i. pl. xix.

3. PSEUDOCHIRUS OCCIDENTALIS, *Thomas* (1888).

Western Ring-tailed Opossum.

Size moderate. General color above deep smoky-gray; below white. Ears thinly hairy, the white spot on the posterior margin small. Hands and feet darker than the rest of the limbs. White tip of tail extending over five or six inches; naked part below smooth, about four inches long.

Dimensions.—Head and body about thirteen inches; tail about twelve inches.

Habitat.—West Australia.

References.—Thomas, B. M. Catal. p. 174, pls. xviii. fig. 6 *(upper jaw)*; xix. fig. 3 *(upper view of skull)*.

4. PSEUDOCHIRUS PEREGRINUS, *Boddaert, sp.* (1785).

Common Ring-tailed Opossum.

Size large. General color above gray or rufous in varying proportions; below white, grayish-white, or rufous. Region round the eyes often prominently rufous. Ears rather large, their backs usually gray anteriorly with the posterior white patch distinct, sometimes uniform rufous. Outer side of arms and legs rufous. Hands and feet white or pale rufous. Middle third of tail black or nearly so; from one to four inches of the tip white; naked part beneath smooth, transversely striated, from one to four inches long.

Dimensions.—Head and body about sixteen inches; tail about fourteen inches.

Habitat.—Eastern Australia from Southern Queensland to South Australia.

References.—Thomas, B. M. Catal. p. 172, pls. xvii. fig. 4 *(ear)*; xviii. fig. 5 *(jaws)*; xix. fig. 2 *(upper view of skull)*; Gould, Mamm. Austr. i. pls. xviii. *(P. cooki)*, xx. *(P. lanuginosa)*.

5. PSEUDOCHIRUS HERBERTENSIS, *Collett, sp.* (1884).

Herbert River Opossum. 'Oota' of the Aborigines

Size moderate. Fur thick, close, and woolly. General color above dark umber-brown; below, chin brown, chest and belly white, or grayish-white with irregular white patches. Ears short,

Limbs dark brown sometimes with white rings. Clothing of tail woolly; from one to three inches of tip white; naked part beneath from five to six inches long, coarsely shagreened.

Dimensions.—Head and body about fourteen inches; tail about thirteen inches.

Habitat.—Herbert River District, Queensland.

References.—Thomas, B.M. Catal. p. 170; Collett, P.Z.S. 1884, p. 383, pl. xxx.

6. Pseudochirus lemuroides, *Collett, sp.* (1884).

Sombre Opossum. 'Yap-pi' of the Aborigines.

Size rather large. Fur soft and woolly. General color above dark brownish-gray; below dirty yellowish-gray. Ears of moderate length. Limbs dark brown becoming black terminally. Tail rather short, clothed with uniform thick black fur; its naked part below short.

Dimensions.—Head and body about fifteen inches; tail about twelve inches.

Habitat.—Herbert River District, Queensland.

References.—Thomas, B.M. Catal. p. 170; Collett, P.Z.S. 1884, p. 385, pl. xxxi.

Genus V.—PETAUROIDES, *Thomas* (1888).

Size large. Fur very long, soft, and silky. Ears very large, oval, naked inside, hairy outside. Flanks with a flying-membrane. Fore toes subequal, their respective lengths as follows—4, 3, 5, 2, 1. Claws very long, strongly curved, and sharply pointed. Tail long, cylindrical, evenly bushy; the extreme tip beneath naked and prehensile.

Dentition.—I. $\frac{1.2.3}{1.2.0}$, C. $\frac{1}{0}$, P. $\frac{1.0.3.4}{1.0.3.4}$, M. $\frac{1.2.3.4}{1.2.3.4}$ = 17 + (at most) 3 (or 16 + 4) × 2 = 40.

Habits.—Arboreal; phytophagous.

Note.—Both the genera whose names have been associated with the Great Flying Opossum prove to be inadmissable, *Voluccella* (Bechstein, 1800) having been used by Fabricius six years previously for a genus of Dipterous insects, while the better known name of *Petaurista* (Desmarest, 1820) had been used as a synonym of *Pteromys* by G. Fischer a few years earlier.

1. Petauroides volans, *Kerr, sp.* (1792).

Greater Flying Opossum.

Fur long, soft, and fluffy. General color dark ashy gray, varying from nearly black to pale whitish-gray. Ears very large,

oval, and evenly rounded, their inner surface entirely naked, their outer thickly covered with fur similar to that on the head. Under surface white or pale yellowish. Outer sides and backs of limbs black or dark brown, inner sides white or pale gray. Hands and feet thickly fringed with black hairs. Fingers and toes very thick. Palms and soles naked, the pads low, rounded, and finely striated. Tail ashy-gray or blackish, generally darkest terminally. Naked part beneath short, not sharply separated from the hairy part, its surface not roughened. Upper canine and first premolar larger than in the succeeding form.

Dimensions.—Head and body about seventeen inches ; tail about twenty inches.

Habitat.—Eastern Australia from Queensland to Victoria.

References.—Thomas, B. M. Catal. p. 164, pls. xvii. figs. 2 *(palms)*, 3 *(naked portion of tail)*; xviii. figs. 1 *(upper view of skull)*, 2 *(dentition)*; Gould, Mamm. Austr. i. pl. xxii.

1a. P. VOLANS, var. MINOR, *Collett, sp.* (1887).

Lesser Flying Opossum.

Differs from the typical form only in its smaller size, in the feebler development of the upper canine and of the first premolar, which latter is quite minute and sometimes absent.

Dimensions.—Head and body about twelve inches ; tail about eighteen inches.

Habitat.—Central Queensland.

References.—Thomas, B. M. Catal. p. 166, pl. xviii. fig. 3 *(dentition)*.

Note.—I do not think that it is advisable to separate Dr. Ramsay's *P. cinereus* from this variety.

Genus VI.—DACTYLOPSILA, *Gray* (1858).

Size medium. Ears oval, nearly naked terminally. No trace of a flying-membrane. Fore toes very unequal, the fourth much the longest, the others respectively as follows—3, 5, 2, 1. Fourth and fifth hind toes much longer than the others. A prominent, proximal pad on the carpus. Claws long. Tail long, cylindrical, evenly bushy, the extreme tip naked below.

Dentition.—I. $\frac{1.2.3}{1.2.3}$, C. $\frac{1}{0}$, P. $\frac{1.0.3.4}{0.0.3.4}$, M. $\frac{1.2.3.4}{1.2.3.4} = 15 + 5 \times 2 = 40$.

Habits.—Arboreal ; phytophagous.

1. DACTYLOPSILA TRIVIRGATA, *Gray* (1858).

Striped Opossum.

Fur close, thick, and woolly, but rather harsh. General color above, white with black stripes ; below, chin with a black spot,

chest, belly, and inner side of limbs white or pale yellow. Three black stripes above, the median one from the occiput along the back and tail, broadest centrally; the lateral stripes commencing on the sides of the snout passing along the neck and back, and sending off-shoots downwards in front of the shoulder, and along the limbs to the hands and feet, which are brown. Soles finely granulated. Pads large, rounded, and finely striated, except the carpal pad, which is narrow, smooth, and unstriated. Terminal third of tail wholly black, or with a prominent white tip; its naked part more than an inch in length.

Dimensions.—Head and body about twelve inches; tail about thirteen inches.

Habitat.—Central Queensland to Waigiou.

References.—Thomas, B. M. Catal. p. 160, pls. xvii. fig. 1 *(hand)*; xxi. fig. 1 *(sole showing pads)*; Gould, Mamm. Austr. i.?

Genus VII.—PETAURUS, *Shaw* (1791).

Size medium or small. Fur very soft and silky. Ears fairly large, oval, nearly naked. Flanks with a broad flying-membrane. Fore toes evenly lengthening outwardly, the fifth being the longest in the larger species, the fourth in the smaller. Claws very strong, sharp, and much curved. Tail long, evenly bushy everywhere. Sexual crown- and chest-glands present.

Dentition.—I. $\frac{1.2.3}{1.2.0}$, C. $\frac{1}{0}$, P. $\frac{1.0.3.4}{1.0.3.4}$, M. $\frac{1.2.3.4}{1.2.3.4} = 16 + 4 \times 2 = 40$.

Habits.—Arboreal; phytophagous.

1. Petaurus australis, *Shaw* (1791).

Yellow-bellied Flying-Opossum.

Size large. Fur long. Rhinarium large, naked, finely granulated. General color above brown, variously marked with orange and black; below, chin and inner sides of wrists and ancles blackish; rest of under surface deep orange. Ears long, narrow, naked inside and terminally outside, with a prominent yellow patch along the posterior margins. Median line of back and upper surface of parachutes dark brown; edges of the latter orange, except near its origin and insertion where it is broadly fringed with black. Hands and feet above black. Palms and soles naked and finely striated, the pads broad, rounded, ill-defined. Length of fore toes as follows—5, 4, 3, 2, 1. Tail very long, very bushy, gray above; below at the base orange, darkening to black at the tip. Mammæ two?

Dimensions.—Head and body about twelve inches; tail about seventeen inches.

Habitat.—Coast ranges of New South Wales and Victoria.

References.—Thomas, B. M. Catal. p. 151, pl. xv. fig. 11 *(palm)*; Gould, Mamm. Austr. i. pl. xxiii.

2. Petaurus sciureus, *Shaw*, *sp.* (1794).

Squirrel-like Flying-Opossum.

Size moderate. Fur soft and silky, slightly woolly. General color above a soft pale gray, with a well defined dark brown or black dorsal band; below white with a tinge of yellow. Ears rather variable in size, nearly naked inside, and terminally outside; a deep black patch present along their external bases, succeeded posteriorly by a prominent white or pale yellow spot. Upper surface of parachute dark brown or grayish, the edges fringed with white or pale yellow. Hands and feet above white or pale gray. Palms and soles much as in *P. australis*, as also is the proportionate length of the toes. Tail moderate, very bushy, its color above and below gray, darkening terminally into black. Mammæ (?)

Dimensions.—Head and body about ten inches; tail about eleven inches.

Habitat.—Eastern Australia from Queensland to Victoria.

References.—Thomas, B. M. Catal. p. 153; Gould, Mamm. Austr. i. pl. xxiv.

3. Petaurus breviceps, *Waterhouse* (1838).

Lesser Flying-Opossum.

Size small. Fur soft and silky. General colors as in *P. sciurens*, but with the dorsal band generally indistinct. Ears large. Length of fore toes as follows—4, 5, 3, 2, 1. Tail markedly more bushy basally.

Dimensions.—Head and body about seven inches; tail about eight inches.

Habitat.—Northern and eastern Australia. Tasmania (*introduced in 1835.*)

References.—Thomas, B. M. Catal. p. 156, pls. xv. fig. 9 *(ear)*; xvi. figs. 9 *(palatal view of skull)*, 10 *(dentition)*; Gould, Mamm. Austr. i. pls. xxv. *(P. breviceps)*, xxvi. *(P. notatus)*, and xxvii. *(P. ariel)*.

Genus VIII.—GYMNOBELIDEUS, *McCoy* (1867).

Size small. General appearance as in *Petaurus*. Ears large, naked, untufted. No flying-membrane. Toes of normal proportions; their respective lengths as follows—4, 3, 5, 2, 1. Claws less developed than in *Petaurus*. Tail long, cylindrical, and bushy.

Dentition.—I. $\frac{1.2.3}{1.2.0}$, C. $\frac{1}{0}$, P. $\frac{1.0.3.4}{1.0.3.4}$, M. $\frac{1.2.3.4}{1.2.3.4} = 16 + 4 \times 2 = 40$.

Habits.—Arboreal; phytophagous.

1. Gymnobelideus leadbeateri, *McCoy* (1867).

Leadbeater's Opossum.

Fur soft and close. General color above brownish-gray; below dull yellowish. A central dusky streak along the nape and back. A dark patch under base of ear, and fainter ones before and behind the eye. Ears large, semi-elliptical, nearly naked towards the tip. Terminal toe-pads of fore feet large and wrinkled. Palm- and sole-pads large, low, and finely striated. Tail pale brown.

Dimensions.—Head and body about five and a half inches; tail about one inch longer.

Habitat.—Victoria (Bass River).

References.—Thomas, B.M. Catal. p. 149; McCoy, Prodr. Zool. Vic. pl. xci. *(animal, skull, and feet).*

Genus IX.—DROMICIA, *Gray* (1841).

Size small. Ears large and thin, almost naked. No flying-membrane. Fingers and toes normally proportioned, without broad terminal pads, the respective lengths of the former as follows—3, 4, 2, 5, 1. Fore claws short and rudimentary; hind claws as usual. Tail cylindrical, its base furry, the remainder finely scaly, and clothed with short hairs; the extreme tip beneath roughened, naked, and prehensile. Mammæ four.

Dentition.—I. $\frac{1.2.3}{1.2.3}$, C. $\frac{1}{0}$, P. $\frac{1 \text{ or } 1.0.3 \text{ or } 3.4}{1 \quad 0.3.4 \text{ or } 4}$, M. $\frac{1.2.3.0 \text{ or } 4}{1.2.3.0 \text{ or } 4} =$ (at most normally) $17 + 3 \times 2 = 40$.

Habits.—Arboreal; phytophagous.

1. Dromicia concinna, *Gould* (1845).

Western Dormouse-Opossum.

Size small; form very light and delicate. General color above bright fawn; the belly hairs pure white throughout. Dark eye-mark almost obsolete. Ears long, rather narrow, evenly oval. Outsides of limbs fawn, insides white. Tail slender, not incrassated.

Dimensions.—Head and body about three inches; tail rather longer.

Habitat.—South and West Australia.

References.—Thomas, B. M. Catal. p. 146, pl. xvi. fig. 8 *(dentition);* Gould, Mamm. Austr. i. pl. xxx.

2. Dromicia nana, *Desmarest, sp.* (1817).

Common Dormouse-Opossum.

Size large; form rather thick and clumsy. Fur thick and soft, rather woolly. Rhinarium naked, finely granulated. General color above uniform dull fawn, below slate color, tipped with dirty white. Dark eye-mark indistinct. Ears large, narrow, evenly oval. Limbs gray; hands brown, feet whitish. Tail rather long; the basal inch incrassated.

Dimensions.—Head and body about four inches; tail rather more.

Habitat.—Tasmania.

References.—Thomas, B. M. Catal. p. 144, pls. xv. figs. 5 *(sole)*, 6 *(palm)*, 7 *(back of hand)*; xvi. figs. 6 *(upper view of skull)*, 7 *(dentition)*; Gould, Mamm. Austr. i. pls. xxvi. xxix.

3. Dromicia lepida, *Thomas* (1888).

Lesser Dormouse-Opossum.

Size small; form slender and graceful. Fur fine, soft, and silky. Rhinarium finely granulated. General color above pale bright fawn, below dark slaty tipped with white. Dark eye-mark inconspicuous. Ears large and broad; almost naked. Palms and soles naked, finely granulated. Tail rather long, the basal half inch furry.

Dimensions.—Head and body rather less than the tail which is about three inches.

Habitat.—Tasmania.

References.—Thomas, B. M. Catal. p. 142, pls. xv. fig. 8 (*ear*); xvi. figs. 2 (*palatal view of skull*), 3 (*upper view of do.*), 4 & 5 (*dentition*).

Genus X.—ACROBATES, *Desmarest* (1817).

Size very small. Ears medium. Flanks with a narrow flying membrane. Toes of normal proportions, all provided with a broadened, striated, terminal pad; length of fore toes as follows—4, 3, 5, 2, 1. Claws sharp and well developed, though but little prominent. Tail with a broad fringe of hairs on each side. Mammæ four.

Dentition.—I. $\frac{1.2.3}{1.2.0}$, C. $\frac{1}{0}$, P. $\frac{1.0.3.4}{1.0.3.4}$, M. $\frac{1.2.3}{1.2.3} = 16 + 2 \times 2 = 36$.

Habits.—Arboreal; insectivorous.

1. Acrobates pygmæus, *Shaw, sp.* (1794).

Pigmy Flying-Opossum.

Form very light and delicate. Fur soft, straight, and silky. Rhinarium naked and well-defined. General color above grayish-

brown, below and inner side of limbs white. Area round and just in front of eyes brown. Tufts of hairs just behind the eye, and inside the ears, which are of medium size, fawn color on the outside anteriorly, white posteriorly. Edges of parachute fringed with longer hairs. Hands and feet brown. Tail rather long, fawn color, its extreme tip below naked, probably prehensile.

Dimensions.—Head and body about three inches; tail about the same length.

Habitat.—Queensland, south of 20° S. lat., New South Wales, and Victoria.

References.—Thomas, B. M. Catal. p. 136; Gould, Mamm. Austr. i. pl. xxviii.

Subfamily III.—Tarsipedinæ.

Tail long. Snout very long and slender; tongue extensile. No cœcum. Cheek-teeth minute and rudimentary.

Genus XI.—TARSIPES, *Gervais & Verreaux* (1842).

Size small; form slender. Head long and narrow; muzzle elongate; tongue long. Ears medium, thinly haired. Palms and soles naked and granulated. All the claws rudimentary, except those on the syndactylous second and third hind toes. Pouch present. Tail very long, thinly haired, prehensile. Mammæ four. Upper canines and lower incisors comparatively well developed.

Dentition (apparently)—I. $\frac{1.2.0}{1.0.0}$, C. $\frac{1}{0}$, P. $\frac{0.0.0.4}{0.0.0.0}$, M. (at most) $\frac{1.2.3}{1.2.3}$ $\times 2 = 22$.

Habits.—Arboreal; insectivorous; mellivorous.

1. Tarsipes rostratus, *Gerv. & Verr.* (1842).

Long-snouted Pouched Mouse.

Fur short, coarse, and hispid. Rhinarium naked, finely granular, sharply defined. General color above gray, striped with black or brown; below yellowish-white. An indistinct pale area round each eye. Ears rounded. Arms and legs gray; hands and feet white. Palms and soles, each with five distinct pads. Fourth and fifth toes disproportionately long and practically clawless, like the hallux; junction of second and third toes very complete. Tail brown above, white or pale yellow on the sides and below; the extreme tip below naked.

Dimensions.—Head and body about three inches; tail about four inches.

Habitat.—West Australia.

References.—Thomas, B. M. Catal. p. 132; Gould, Mamm. Austr. i. pl. v.

Family V.—MACROPODIDÆ.

Progression generally saltatorial. Hind limbs much the longer. Fore feet with fire digits; hind feet syndactylous, the fourth toe very large with a strong claw; the fifth similar but smaller; the second and third slender and united. Stomach sacculated. Cœcum present. Pouch large, opening forwards.

Subfamily I.—HYPSIPRYMNODONTINÆ.

Size very small. Claws small, feeble, and subequal. *Hallux present, opposable.* Tail naked and scaly.

Genus I.—HYPSIPRYMNODON, *Ramsay* (1876).

Form rat-like. Rhinarium wholly naked. Ears large, thin, and naked. Limbs subequal, not saltatorial. Hind feet with a long opposable clawless hallux; fourth toe not disproportionately larger than the others, the fifth and combined second and third toes all well developed. Tail cylindrical, tapering, only the extreme base hairy.

Dentition.—I. $\frac{1.2.3}{1.0.0}$, C. $\frac{1}{0}$, P. $\frac{0.0.3.4}{0.0.3.4}$, M. $\frac{1.2.3.4}{1.2.3.4} \times 2 = 34$.

Habits.—Terrestrial, and at least partially arboreal; insectivorous, frugivorous, and rhizophagous.

1. HYPSIPRYMNODON MOSCHATUS, *Ramsay* (1876).

Australian Musk Rat.

Fur close, crisp, and velvety. Ears rounded, naked except at their bases behind, blackish flesh-color. General color above and below finely grizzled rusty orange-gray, the orange deepest on the back. Fingers naked and scaly; palms with five large transversely ridged pads; upper surface of fourth toe only hairy; soles with five transversely striated pads. Tail naked except on the proximal inch, scaly, black above, paler below.

Dimensions.—Head and body about ten inches; tail about six and a half inches.

Habitat.—Herbert River District, Queensland.

Type.—In the Australian Museum, Sydney.

References.—Thomas, B.M. Catal. p. 123, pls. xiv. fig. 11 *(fourth premolar)*, xv. fig. 1 *(hind foot)*; Ramsay, P.L.S. N.S.W. i. p. 34.

Subfamily II.—Potoroïnæ.

Rat-Kangaroos.

Size small. Claws of fore feet very large, those of the three median digits disproportionately larger than those of the outer. *Hallux wanting.* Tail long and hairy. Canines always present, generally well developed.

Genus II.—POTOROUS, *Desmarest* (1804).

Size variable. Rhinarium naked. Ears very short, rounded. Fore claws long and rather slender. Hind limb not disproportionately longer than the fore limb; hind feet very short, shorter than the head, the soles naked and coarsely granulated. Tail tapering, hairy, without trace of crest.

Dentition.—I. $\frac{1.2.3}{1.0.0}$, C. $\frac{1}{0}$, P. $\frac{0.0.3.4}{0.0.3.4}$, M. $\frac{1.2.3.4}{1.2.3.4} \times 2 = 34$.

Habits.—Terrestrial; herbivorous.

1. Potorous platyops, *Gould*, *sp.* (1844).

Broad-faced Rat-kangaroo.

Size very small. Naked part of rhinarium not extending backwards along the top of the muzzle. Face very short and broad. Fur long, coarse, and straight. Hind feet very short, long-haired. General color above grizzled dark grayish-brown; below white or grayish-white. Back of ears dark brown. Tail black above, dirty-white below.

Dimensions.—Head and body about fourteen inches; tail about eight inches; hind foot less than two-thirds of an inch.

Habitat.—West Australia.

References.—Thomas, B.M. Catal. p. 121, pl. xiii. fig. 13 *(upper view of skull)*; Gould, Mamm. Austr. ii. pl. lxx.

2. Potorous gilberti, *Gould*, *sp.* (1841).

Gilbert's Rat-Kangaroo.

Size medium. Naked part of rhinarium extending backwards along the top of the muzzle. Face long and narrow. Hind feet long, short-haired. Fur and general colors as in *P. platyops*. Tail gray at base, deepening in color to black terminally.

Dimensions.—Head and body about fifteen and a half inches; tail about seven inches; hind foot more than two-thirds of an inch.

Habitat.—South-west Australia.

References.—Thomas, B.M. Catal. p. 120; Gould, Mamm. Austr ii. pl. lxix.

3. Potorous tridactylus, *Kerr, sp.* (1792).

Common Rat-Kangaroo.

Size variable, large, or medium. Other external characters as in *P. gilberti*, but the naked part of the rhinarium extends rather further backwards.

Dimensions.—Head and body about sixteen and a half inches; tail about nine inches; hind foot from two-thirds to four-fifths of an inch.

Habitat.—New South Wales, Victoria, South Australia and Tasmania.

References.—Thomas, B.M. Catal. p. 117, pls. xi. fig. 13 *(rhinarium)*, xiii. fig. 12 *(fourth premolar)*, xiv. fig. 10 *(nasals)*; Gould, Mamm. Austr. ii. pls. lxvii. *(P. murinus)*, lxviii. *(P. apicalis)*.

The two Tasmanian forms, *P. apicalis* which is larger and *P. rufus* which is smaller than continental examples may prove to be good species.

Genus III.—CALOPRYMNUS, *Thomas* (1888).

Rhinarium naked. Ears short and rounded. Fore-claws long and strong. Hind feet longer than the head, their soles naked and coarsely granulated. Tail thin, cylindrical, evenly short-haired, without trace of crest.

Dentition.—I. $\frac{1.2.3}{1.0.0}$, C. $\frac{1}{0}$, P. $\frac{0.0\,3.4}{0.0.3.4}$, M. $\frac{1.2.3.4}{1.2.3.4} \times 2 = 34$.

Habits.—Terrestrial; herbivorous.

1. Caloprymnus campestris, *Gould, sp.* (1843).

Plain Rat-Kangaroo.

Size large. Form slender and delicate. Face broad between the orbits. Fur soft and straight. General color above grizzled sandy, darker on the back, brighter on the sides; below pale sandy-white. Ears with close, short, yellow hairs. Arms and legs bright sandy rufous; hands and feet white, the hairs quite short. Tail sparsely clothed with pale yellowish hairs, which are closest on the underside of the tip. Centre of chest naked and apparently glandular.

Dimensions.—Head and body about eighteen inches; tail about fourteen inches.

Habitat.—South Australia.

References.—Thomas, B.M. Catal. p. 115, pls. xiii. fig. 11 *(fourth premolar)*, xiv. fig. 9 *(upper view of skull)*; Gould, Mamm. Austr. ii. pl. lxvi.

Genus IV.—BETTONGIA, *Gray* (1837).

Rhinarium wholly naked. Ear very short and rounded. Fore claws long and strong. Hind feet longer than the head, the soles naked and coarsely granulated. Tail more or less prehensile, thickly hairy, with a more or less distinct crest.

Dentition.—I. $\frac{1.2.3}{1.0.0}$, C. $\frac{1}{0}$, P. $\frac{0.0.3.4}{0.0.3.4}$, M. $\frac{1.2.3.4}{1.2.3.4} \times 2 = 34$.

Habits.—Terrestrial; herbivorous.

Note.—It occasionally happens that a fifth molar is present either in one or both rami of the upper jaw, or even in both rami of both jaws, so that, as Mr. Oldfield Thomas remarks, while having the comparatively highly specialized characters of the other members of the family, this genus presents the remarkable condition of retaining such an ancient and generalized character as the possession of more than four molars. On the other hand the fourth molar is often aborted. The members of this genus alone among terrestrial mammals possess prehensile tails, which they use for carrying grass, sticks, &c., these being firmly held by the tail being twisted downwards upon them. The four species are very similar to each other externally, so much so that no reliance can be placed on any determination which does not rest upon an examination of the cranial and dental characters.

1. Bettongia lesueuri, *Quoy & Gaimard, sp.* (1824).

Lesueur's Rat-Kangaroo.

Fur soft, close, and thick. General color above grizzled gray; below white; sometimes an indistinct white hip-mark. Arms and legs white; hands and feet white or pale brown; hairs of the latter long and bristly, nearly covering the claws. Tail colored above like the back, the upper hairs not forming a distinct crest; below pale brown or white; the tip white.

Dimensions.—Head and body about eighteen inches; tail about twelve inches.

Habitat.—South and West Australia.

References.—Thomas, B.M. Catal. p. 112, pls. xiii. figs. 6 and 7 *(teeth)*, xiv. fig. 7 *(nasals)*, 8 *(bulla)*; Gould, Mamm. Austr. ii. pl. lxiv.

2. Bettongia cuniculus, *W. Ogilby, sp.* (1838).

Tasmanian Rat-Kangaroo.

Fur and general color as in *B. lesueuri*, but without trace of hip-mark. Arms, legs, hands, and feet white; hairs of latter as in *B. lesueuri*. Tail above as in *B. lesueuri*, except that towards the end it occasionally becomes dark brown or black; below dirty white; tip sometimes white all round.

Dimensions.—Head and body about eighteen inches; tail about fifteen inches.

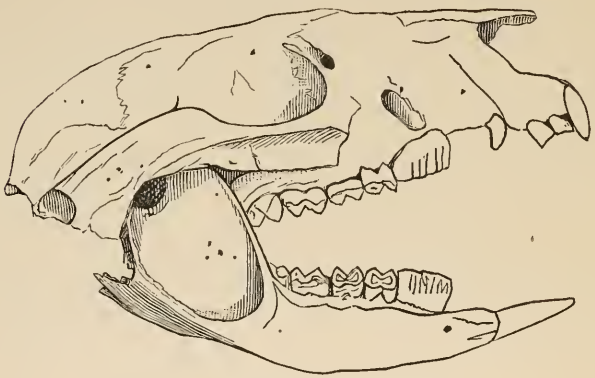
Habitat.—Tasmania.

References.—Thomas, B.M. Catal. p. 106, pls. xiii. fig. 8 *(fourth premolar)*, xiv. figs. 1 *(nasals)*, 2 *(bulla)*; Gould, Mamm. Austr. ii. pl. lxiii.

3. BETTONGIA GAIMARDI, *Desmarest, sp.* (1822).

Gaimard's Rat-Kangaroo.

Fig. 3.



Side view of skull, showing dentition.

Fur woollier than in the other species. General colors as in *B. lesueuri*, but the general tone rather more yellowish or fawn. Hind feet white. Distal two-thirds of the tail growing gradually darker, and the hairs lengthening, till, on the terminal third, there is a distinct black crest; below short-haired, white.

Dimensions.—Head and body about sixteen inches; tail about eleven inches.

Habitat.—New South Wales.

References.—Thomas, B.M. Catal. p. 108, pls. xiii. fig. 10 *(fourth premolar)*, xiv. figs. 3 *(nasals)*, 4 *(bulla)*; Gould, Mamm. Austr.

4. BETTONGIA PENICILLATA, *Gray* (1837).

Brush-tailed Kangaroo-Rat.

Fur and general colors not definitely different from the other species. Hands and feet pale brown. Bristly hairs of feet not hiding the claws. Tail long, with a prominent black crest along the terminal one-third or two-thirds of its upper surface; below pale brown.

Dimensions.—Head and body about fourteen inches; tail about twelve inches.

Habitat.—Australia except the extreme north.

References.—Thomas, B. M. Catal. p. 110, pls. xi. fig. 12 *(rhinarium)*, xiii. fig. 9 *(fourth premolar)*, xiv. figs. 5 *(nasals)*, 6 *(bulla)*; Gould, Mamm. Austr. ii. pls. lxi. *(B. penicillata)*, lxii. *(B. ogilbyi)*.

Genus V.—ÆPYPRYMNUS, *Garrod* (1875).

Rhinarium partially hairy. Ear rather long. Fore claws very long and strong. Hind feet longer than the head, the soles narrow, naked, and coarsely granulated. Tail evenly hairy, without trace of crest.

Dentition.—I. $\frac{1.2.3}{1.0.0}$, C. $\frac{1}{0}$, P. $\frac{0.0.3.4}{0.0.3.4}$, M. $\frac{1.2.3.4}{1.2.3.4} \times 2 = 34$.

Habits.—Terrestrial; herbivorous.

1. Æpyprymnus rufescens, *Gray, sp.* (1837).

Rufous Rat-Kangaroo.

Size large. Rhinarium partially hairy to about half-way down the nasal septum. Fur long and coarse. General color above rufescent gray; below dirty white; an indistinct white stripe across the sides just in front of the hips. Back of ears black or dark brown. Outside of hind legs gray, rest of limbs white. Hairs on back of hands long and coarse, partly hiding the claws. Feet brown or grayish-brown; central claw long and strong. Tail thickly hairy, without trace of crest, pale gray above, white below.

Dimensions.—Head and body about twenty-one inches; tail about fifteen inches.

Habitat.—New South Wales.

References.—Thomas, B.M. Catal. p. 103, pls. xi. fig. 11 *(rhinarium)*, xiii. fig. 5 *(molars)*; Gould, Mamm. Austr. ii. pl. lxv.

Subfamily III.—Macropodinæ.

Kangaroos; Wallabies.

Size variable. Claws of fore feet of moderate size and subequal. *Hallux wanting.* Tail long and hairy. Canines generally minute or absent, rarely well developed.

Genus VI.—LAGOSTROPHUS, *Thomas* (1886).

Form macropine. Rhinarium naked. Hind feet covered with long bristly hairs, hiding the claws. Back cross-banded.

Dentition.—I. $\frac{1.2.3}{1.0.0}$, C. $\frac{0}{0}$, P. $\frac{0.0.3.4}{0.0.3.4}$, M. $\frac{1.2.3.4}{1.2.3.4} \times 2 = 32$.

Habits.—Terrestrial; herbivorous.

1. Lagostrophus fasciatus, *Peron & Lesson, sp.* (1807).

Banded Hare-Wallaby.

Size small; form light and graceful. Hair of muzzle growing downwards to level of upper internal angle of nostril. Fur thick and soft. General color above grizzled grayish-brown, arranged posteriorly in black and white transverse bands; below mixed gray and white. Ears short, their backs gray. Arms and backs of legs gray with a reddish tinge; hands and feet yellowish-gray. Tail uniformly clothed with close-set short hairs, yellowish-gray above, dull yellow below.

Dimensions.—Head and body about eighteen inches; tail about thirteen inches.

Habitat.—West Australia.

References.—Thomas, B.M. Catal. p. 100, pls. xi. fig. 10 *(rhinarium)*, xiii. fig. 4 *(upper incisors, &c.)*; Gould, Mamm. Austr. ii. pl. lvi.

Genus VII.—DENDROLAGUS, *Schlegel & Müller* (1839 - 44).

Form not macropine. Rhinarium broad, only partially naked, very short scattered hairs being present down to the upper part of the nasal septum. Fur on nape and sometimes on back directed forwards. Anterior limbs stout and strong, nearly as large as the posterior. Hind feet broad, the syndactylous second and third toes not disproportionately smaller than the two outer. Claws stout and strong, those on the fourth and fifth hind toes curved like those on the hand. Tail very long, evenly and thickly haired.

Dentition.—I. $\frac{1.2.3}{1.0.0}$, C. $\frac{1}{0}$, P. $\frac{0.0.3.4}{0.0.3.4}$, M. $\frac{1.2.3.4}{1.2.3.4} \times 2 = 34$.

Habits.—Arboreal; phytophagous.

1. Dendrolagus lumholtzi, *Collett* (1844).

Queensland Tree-Kangaroo.

Size thick. Fur long and rather coarse, reversed from withers to crown. Face black; a paler band across the forehead. Ears black without, yellow within; the hairs short and coarse. Back pale grizzled gray, sides and belly pale yellowish-white; chin black, chest white. Arms to wrists, and legs to ankle pale yellow; wrists and ankles darker; fingers and toes black. Tail mixed black and pale yellow, the upper side the paler, but with a darker patch near the base.

Dimensions.—Head and body about twenty-six inches; tail about the same length.

Habitat.—Herbert River District, Queensland.

References.—Thomas, B.M. Catal. p. 96, pl. xiii. fig. 1 *(molars)*; Collett, P.Z.S. 1884, p. 387, pl. xxxii.

Note.—There is not at present sufficient evidence to justify the retention of Mr. De Vis' two supposed species *D. bennettianus* and *D. rufus* as distinct from Collett's animal.

Genus VIII.—LAGORCHESTES, *Gould* (1841).

Form macropine. Rhinarium wholly or partly hairy. Central hind claws long and strong, not hidden by the hair. Tail rather short, evenly short-haired throughout. No trace of a caudal spur.

Dentition.—I. $\frac{1.2.3}{1.0.0}$, C. $\frac{1 \text{ or } 1}{0}$, P. $\frac{0.0.3.4}{0.0.3.4}$, M. $\frac{1.2.3.4}{1.2.3.4} \times 2 = 34$.

Habits.—Terrestrial; herbivorous.

1. Lagorchestes hirsutus, *Gould* (1844).

Rufous Hare-Wallaby.

Form light and slender. Rhinarium nearly wholly hairy. Muzzle narrow and light. Fur long and coarse; under fur of back dark slate, with pale or rufescent tips. General color above finely grizzled gray, becoming rich rufous on the rump; below yellowish-gray. Band round eye but slightly rufous. Ears long, more than one-third of the hind foot, their backs grizzled-gray, insides and edges white. Lateral bands inconspicuous. No black patch on the elbow. Arms, hands, front of legs and feet pale yellowish-white or gray; outsides and backs of legs rufous. Tail dull grizzled-gray, short-haired. Canines small.

Dimensions.—Head and body about eighteen inches; tail about fifteen inches.

Habitat.—West Australia.

References.—Thomas, B. M. Catal. p. 87; Gould, Mamm. Austr. ii. pl. lviii.

2. Lagorchestes leporoides, *Gould, sp.* (1840).

Common Hare-Wallaby.

General color above coarsely grizzled yellowish-brown; below dirty yellowish-gray. Rufous band round the eye prolonged forwards on the sides of the muzzle. Backs and insides of ears whitish. A black patch on the elbow. Legs colored like the body; hands and feet finely grizzled grayish-white. Tail brownish-gray above, nearly white on sides and below. Other characters as in *L. hirsutus*.

Dimensions.—Head and body about twenty inches; tail about thirteen inches.

Habitat.—Interior of New South Wales; South Australia.

References.—Thomas, B.M. Catal. p. 82, pls. ix. fig. 13 *(upper front teeth)*, xi. fig. 4 *(rhinarium)*; Gould, Mamm. Austr. ii. pl. lvii.

3. Lagorchestes conspicillatus, *Gould* (1841).

Spectacled Hare-Wallaby.

Form comparatively thick and heavy. Rhinarium with lower half of nasal septum and edges of nostrils naked. Muzzle broad and heavy. Fur long and coarse; under fur of back uniform blackish-brown. General color above coarsely grizzled yellowish-gray; below mixed white and slaty-gray. Chestnut band round the eye well defined, not prolonged forwards on the sides of the muzzle. Ears short, less than one-third of the hind foot, their backs grizzled-gray, the insides and edges nearly white. Two whitish lateral bands. Arms, hands, legs, and feet gray, tinged with rufous. Tail above and on the sides clothed with scattered white hairs, except at the very base where they are gray; below more closely set and tinged with fawn. Canines well developed and functional.

Dimensions.—Head and body about twenty inches; tail about seventeen inches.

Habitat.—Islands off the North-west coast of Australia.

References.—Thomas, B.M. Catal. p. 80, pls. ix. fig. 12 *(upper front teeth)*, x. fig. 16 *(fourth premolar)*, xiii. fig. 3 *(upper view of skull)*; Gould, Mamm. Austr. ii. pl. lix.

4. Lagorchestes leichhardti, *Gould* (1863).

Leichhardt's Hare-Wallaby.

Essential characters as in *L. conspicillatus*, but with the ears slightly longer, and the coloration much more brilliant. Back deep fawn color; band round the eye rich bright rufous. Under side and lateral bands nearly pure white.

Dimensions.—Head and body about twenty-one inches; tail about eighteen inches.

Habitat.—North Australia.

Type.—In the Australian Museum, Sydney.

References.—Thomas, B.M. Catal. p. 82; Gould, Mamm. Austr. ii. pl. lx.

Note.—My reason for continuing to keep the continental form at least provisionally separate from the insular, notwithstanding the opinions of such eminent mammalogists as Messrs. Collett and Thomas, is that the skull of an undoubted specimen of *L. conspicillatus* which has been recently received at the Museum from Cambridge Gulf, is much stouter and shorter than that figured by Thomas *(loc. cit.)* as *L. leichhardti*.

Genus IX.—ONYCHOGALE, *Gray* (1841).

Rhinarium hairy or nearly so. Central hind claws long, narrow, compressed, and very sharp. Tail long, tapering, short-haired, more or less crested towards the tip, the extremity provided with a spur or nail. Canines small or absent.

Dentition.—I. $\frac{1.2.3}{1.0.0}$, C. $\frac{0 \text{ or } 1}{0}$, P. $\frac{0.0.0.4}{0.0.5.4}$, M. $\frac{1.2.3.4}{1.2.3.4} \times 2 = 32$.

Habits.—Terrestrial; herbivorous.

1. Onychogale lunata, *Gould, sp.* (1840).

Crescent Wallaby.

Size small; form very light and delicate. Rhinarium narrow, the base of the internasal septum naked. Fur soft and woolly. General color above dark gray; below whitish. Ears short, brown outside, white inside. Back and sides of neck rich rufous. White shoulder-stripe very prominent, not continued along the back of the neck. Two inconspicuous hip-stripes. Arms, legs, and feet pale gray; fingers and toes brown. Tail short, uniform gray, its terminal nail consisting of a very short, rounded point. Canines generally present, quite functionless.

Dimensions.—Head and body about twenty inches; tail about thirteen inches.

Habitat.—West and South Australia.

References.—Thomas, B. M. Catal. p. 77, pl. ix. fig. 11 *(upper front teeth)*; Gould, Mamm. Austr. ii. pl. lv.

2. Onychogale frenata, *Gould, sp.* (1840).

Bridled Wallaby.

Size small; form very small and delicate. Rhinarium narrow, wholly hairy. Fur soft and thick. General color above clear gray; below, chin and chest white, belly pale gray. Ears short, grayish-brown outside, white inside. Middle of back of neck black. White shoulder stripe prominent, continued along the sides of the back of the neck to just behind the ear. Sides of neck gray with a rufous tinge. An inconspicuous pale hip-stripe. Arms and outside of legs and feet white. Tail of medium length uniform gray, the extreme tip black. Terminal nail as in *O. lunata*. Canines nearly always absent.

Dimensions.—Head and body about twenty-two inches; tail about eighteen inches.

Habitat.—Interior of southern Queensland, New South Wales, and Victoria.

References.—Thomas, B.M. Catal. p. 75, pl. xi. fig. 7 *(nail of tail)*; Gould, Mamm. Austr. ii. pl. liv.

3. Onychogale unguifera, *Gould, sp.* (1840).

Nail-tailed Wallaby.

Size large; form light and slender. Rhinarium broad, partially hairy, the hair extending downwards barely to the level of the lower edge of the nostril. Fur thick, close, and rather short. General color above rich sandy fawn, with a median darker band of varying intensity on the back and rump; below white. Ears thinly clothed with white hairs. An indistinct white mark behind the elbow. White hip-stripe present. Arms, hands, feet and fromt of legs white; back of legs fawn color. Tail very long, white above, sandy-gray below; the terminal third with brown rings which gradually darken posteriorly, and finally coalesce with the black tail tip, the black hairs forming a crest on the upper side, and a well marked pencil at the tip; terminal nail large and flattened laterally, hidden by the black pencil. Canines present, perhaps to some extent functional.

Dimensions.—Head and body about twenty-six inches; tail about the same length.

Habitat.—North-western and northern Central Australia.

References.—Thomas, B.M. Catal. p. 74, pls. ix. fig. 10 *(upper front teeth)*, xi. figs. 5 *(rhinarium)*, 6 *(nail of tail)*; Gould, Mamm. Austr. ii. pls. lii., liii.

Genus X.—PETROGALE, *Gray* (1837).

Rhinarium naked. Fur on back of neck directed downwards. Central hind claws very short. Tail long, cylindrical, thickly haired, its extremity pencilled. No canines.

Dentition.—I. $\frac{1.2.3}{1.0.0}$, C. $\frac{0}{0}$, P. $\frac{0.0.3.4}{0.0.3.4}$, M. $\frac{1.2.3.4}{1.2.3.4}$ × 2 = 32.

Habits.—Terrestrial; herbivorous.

1. Petrogale concinna, *Gould* (1842).

Little Rock-Wallaby.

Size small; form slender. Fur short, soft, and silky. General color above rich orange rufous; below white or grayish-white. Face markings obsolete. Ears very short, their backs pale fawn. No shoulder or flank markings. Arms, legs, and feet grayish-fawn. Terminal pencil of tail yellowish-brown.

Dimensions.—Head and body of ♂ imm. about fourteen inches.

Habitat.—North-west Australia.

References.—Thomas, B.M. Catal. p. 71, pls. ix. fig. 9 *(upper front teeth)*, xii. fig. 4 *(upper view of skull)*; Gould, Mamm. Austr. ii. pls. xlviii.

2. Petrogale inornata, *Gould* (1842).

Plain-colored Rock-Wallaby.

Size medium. General color above sandy-gray; below sandy-white. Face markings indistinct. Ears sandy-gray. A dusky red patch behind the elbow. No shoulder or flank markings. Basal half and greater part of the sides of the tail sandy-brown, the remainder black.

Dimensions.—Head and body about twenty-three inches; tail about twelve inches.

Habitat.—North coast of Australia.

References.—Thomas, B. M. Catal. p. 70; Gould, Mamm. Austr. ii. pls. xlv., xlvi.

3. Petrogale brachyotis, *Gould* (1840).

Short-eared Rock-Wallaby.

Size medium; form light and slender. Fur short and thin. General color above grayish-fawn, below grayish-white. Face markings almost obsolete. Ears very short, their backs fawn-gray, their edges and extreme tips white. Body markings present but not prominent; a dark brown blotch behind the elbow, succeeded by a whitish band. Limbs pale gray. Tail gray above, whitish below; the terminal fourth below tufted with longer dark brown hairs.

Dimensions.—Head and body about twenty-two inches; tail about sixteen inches.

Habitat.—North-west coast of Australia.

References.—Thomas, B. M. Catal. p. 69, pl. xii. fig. 2 *(upper view of skull)*; Gould, Mamm. Austr. ii. pl. xlvii.

4. Petrogale lateralis, *Gould* (1842).

West Australian Rock-Wallaby.

Size medium; form slender and light. Fur long, soft, close, of a rather woolly texture. General color above light gray, below yellowish-gray. A well defined dark whisker-mark with a whitish or yellowish cheek-stripe below. A narrow black or brown stripe from the occiput to the centre of the back. Ears short, the inside, base and extreme tip of outside yellow, the rest brown. A prominent black or brown mark behind the elbow, succeeded by a white stripe running down to the hip. Front of knee brown, connected by a brown band to shoulder spot. Arms, legs, and feet gray; fingers and toes black. Tail gray for the proximal, black for the terminal half.

Dimensions.—Head and body about twenty-four inches; tail about seventeen inches.

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Habitat.—West Australia.

References.—Thomas, B. M. Catal. p. 68, pls. ix. fig. 8 *(upper front teeth)*, x. fig. 15 *(fourth premolar)*, xii. fig. 3 *(upper view of skull)*; Gould, Mamm. Austr. ii. pls. xli., xlii.

5. Petrogale penicillata, *Gray*, *sp.* (1827).

Brush-tailed Rock-Wallaby.

Size large; form stout and heavy. Fur long, thick, and coarse. General color above dull brown, more rufous on the rump; below, chin and chest pale gray, belly brown tinged with yellow; anal region rich yellowish-rufous. Whisker-mark and cheek-stripe ill-defined. Occipital streak black, not extending on to neck. Ears short, their insides and posterior margins yellow; remainder gray at base, black terminally. A black mark behind the shoulder, succeeded by a pale gray one, both often inconspicuous. Arms and legs brown or rufous-brown; fingers and toes black. Tail long, more or less bushy, the basal three or four inches rufous, the rest black, the extreme tip sometimes yellow.

Dimensions.—Head and body about twenty-nine inches; tail about twenty-three inches.

Habitat.—Coastal Districts of Queensland, New South Wales, and Victoria.

References.—Thomas, B. M. Catal. p. 66, pls. ix. fig. 7 *(upper front teeth)*, x. fig. 14 *(fourth premolar)*; Gould, Mamm. Austr. ii. pls. xxxix., xl.

6. Petrogale xanthopus, *Gray* (1854).

Yellow-footed Rock-Wallaby.

Size large. Fur long, soft, and silky. General color above gray, below white. White cheek stripe well defined; a rich orange spot above each eye. Ears long, uniform yellow behind. A well defined black streak from the occiput to the middle of the back. A triangular brown blotch behind the elbow, succeeded by a white stripe running down to the hip; top of knee brown, with a white patch outside it. Limbs uniform rich yellow; tips of fingers and toes brown. Tail above and on the sides with alternate rings of dark brown and pale yellow, the brown gradually coalescing above posteriorly to form a blackish crest; below uniform yellowish- or brownish-white; extreme tip sometimes yellow.

Dimensions.—Head and body about thirty-two inches; tail about twenty-four inches.

Habitat.—South Australia.

References.—Thomas, B.M. Catal. p. 64, pl. xii. fig. 1 *(upper view of skull)*; Gould, Mamm. Austr. ii. pls. xliii., xliv.

Genus XI.—MACROPUS, *Shaw* (1790).

Size variable. Rhinarium generally wholly naked. Ears well developed. Fur on nape normally directed downwards. Limbs very unequal, the hind much longer and stronger than the fore. Central hind claws long. Tail thick, tapering, evenly haired (except in *M irma*). Mammæ four.

Dentition.—I. $\frac{1.2.3}{1.0.0}$, C. $\frac{0 \text{ or } 1}{0}$, P. $\frac{0.0.3.4}{0.0.3.4}$, M. $\frac{1.2.3.4}{1.2.3.4} \times 2 = 32$.

Habits.—Terrestrial; herbivorous.

1. Macropus brachyurus, *Quoy & Gaimard, sp.* (1830).

Short-tailed Wallaby.

Size small; form short and squat. Rhinarium with a central upward projection. Fur long, thick, and coarse. General color above coarsely grizzled gray-brown; below slaty-gray. Ears very short and rounded; the backs thickly haired, grizzled gray. Hands and feet brown. Tail very short, about twice the length of the head; brown above; grayish-white beneath.

Dimensions.—Head and body about twenty-three inches; tail about ten inches.

Habitat.—West Australia.

References.—Thomas, B.M. Catal. p. 60, pls. vii. fig. 4 *(upper view of skull)*; ix. fig. 6 *(upper incisors)*; x. fig. 13 *(fourth premolar)*; Gould, Mamm. Austr. ii. pls. xxxvii., xxxviii.

2. Macropus billardieri, *Desmarest* (1822).

Rufous-bellied Wallaby.

Size small; form stout and heavy. Fur long, thick, and soft. General color above grayish-brown with an olive tinge, especially on the head and rump; below yellow, orange, or rufous, most intense on the anal region. Ears very short, their backs olive-gray, margined anteriorly with black. An indistinct nuchal stripe often, and a faint yellowish hip-stripe sometimes, present. Arms and legs gray-brown; hands and feet brown. Tail very short, about two and a half times as long as the head; above proximally orange, below distally grayish-white; the remainder grayish-brown.

Dimensions.—Head and body about twenty-six inches, tail about fourteen inches.

Habitat.—South-eastern South Australia; Victoria; Tasmania; Islands in Bass' Straits.

References.—Thomas, B.M. Catal. p. 58, pl. x. fig. 12 *(fourth premolar)*; Gould, Mamm. Austr. ii. pls. xxxv., xxxvi.

3. Macropus eugenii, *Desmarest, sp.* (1817).

(Halmaturus derluanus, Gould.)

Size small; form light and graceful. Rhinarium ending some distance from the mouth. Fur rather short in mainland, longer in island, specimens. General color above grizzled gray with rufous shoulders; below white or grayish-white. Generally an indistinct white cheek-stripe. Ears long in mainland, short in island, specimens, dark gray. An ill-defined dark streak from the occiput to the back. Shoulders, sides of neck, and arms rufous. Hands, feet, and tail gray; nearly black at their extremities.

Dimensions.—Head and body from about twenty-four inches in mainland to twenty-eight in island examples; tail about seventeen inches in both forms.

Habitat.—Mainland of Western Australia; Islands off the coast of West and South Australia.

References.—Thomas, B.M. Catal. p. 54, pls. vii. fig. 3 *(upper view of skull)*, x. fig. 10 *(fourth premolar)*, and xi. fig. 3 *(rhinarium)*; Gould, Mamm. Austr. ii. pls. xxix., xxx.

4. Macropus parma, *Waterhouse* (1846).

White throated Wallaby.

Size small. Essential characters as in *M. eugenii*, but with the back more rufous, not contrasting with the nape. White cheek-stripe and brown nuchal stripe clearer. Front of throat pure white, sharply contrasting with sides of neck. Belly grayish-white. Ears short their backs rufous gray.

Dimensions.—Head and body about twenty-six inches; tail about seventeen inches.

Habitat.—New South Wales.

References.—Thomas, B.M. Catal. p. 57, pls. ix. fig. 5 (*upper incisors*) and x. fig. 11 (*fourth premolar*); Gould, Mam. Austr. ii. p. xxviii.

5. Macropus thetidis, *Lesson* (1827).

Pademelon.

Size small; form light and agile. Rhinarium broad to the lip, the latter little developed. Fur of medium length, thick and soft, its direction on the neck variable, sometimes directed forwards. General color above grizzled gray, the neck rufous; below white. No nuchal streak. Ears long, their backs gray, edged anteriorly with brown or black. Sometimes a faint light hip-stripe. Arms and legs gray or rufous; hands and feet pale brown. Basal fourth of tail gray; the remainder brown above, white below.

Dimensions.—Head and body about twenty-five inches; tail about sixteen inches.

Habitat.—Victoria; New South Wales; South Queensland.

References.—Thomas, B.M. Catal. p. 52, pls. viii. fig. 3 (*upper view of skull*) and x. fig. 9 (*fourth premolar*); Gould, Mamm. Austr. ii. pls. xxxi., xxxii.

6. Macropus stigmaticus, *Gould, sp.* (1860).

Branded Wallaby.

Size medium; form light and slender. Rhinarium with a central upward projection; lower part continued to the lip. Fur short, close, and rather coarse. General color above rufous-gray, the gray predominating in front, the rufous behind; below white. Crown, cheeks, and region round the base of the ear deep rust-color. An indistinct pale cheek-stripe with a rufous line below it. Back of ears, occiput, and nape brown; an indistinct darker nuchal stripe. two lateral longitudinal bright rusty bands. Hip-stripe yellowish, very prominent. Arms rufous, legs brilliant rust-color, hands and feet gray or rufous-gray; tips of toes brown. Tail gray-brown above; whitish below.

Dimensions.—Head and body about twenty-eight inches; tail about fifteen inches.

Habitat.—North-eastern Queensland.

References.—Thomas, B.M. Catal. p. 47, pl. x. fig. 7 (*fourth premolar*); Gould, Mamm. Austr. ii. pls. xxxiii., xxxiv.

7. Macropus wilcoxi, *McCoy, sp.* (1866).

Red-legged Wallaby.

Size small; essential characters as in *L. stigmaticus*, but the fur is longer and softer and the colors less brilliant. Base of outside of ear rusty. Flanks gray; legs from the thighs rusty-red. Hip-stripe almost or wholly obsolete; tip of tail usually white. Belly grayish-white.

Dimensions.—Head and body about twenty-four inches; tail about fourteen inches.

Habitat.—New South Wales; Southern Queensland.

References.—Thomas, B.M. Catal. p. 48, pls. viii. fig. 2 (*upper view of skull*), and x. fig. 8 (*fourth premolar*).

8. Macropus coxeni, *Gray, sp.* (1866).

Cape York Wallaby.

Size small; form rather stout and thick. Rhinarium with a central upward projection. Fur short, close, and coarse. General color above dark sandy-gray; below white. Face-markings inconspicuous; a faint light cheek-stripe. Back of ears, occiput,

back of neck, withers, and a patch behind the forearm dark brown. A well marked white hip-stripe. Arms and legs sandy; tips of toes brown. Tail black above; white below and at the extreme tip.

Dimensions.—Head and body about twenty-eight inches; tail about fifteen inches.

Habitat.—Northern Queensland.

References.—Thomas, B. M. Catal. p. 44, pls. viii. fig. 1 (*upper view of skull*), x. fig. 6 (*fourth premolar*), and xi. fig 1 (*rhinarium*) Gray, P.Z.S. 1866, p. 220, pl. xxv.

9. Macropus agilis, *Gould sp.* (1841).

Agile Wallaby.

Size medium; form rather stout and heavy. Rhinarium partly hairy between the nostrils. Fur short and coarse. General color above dark grizzled sandy, below white or grayish-white. Face-markings inconspicuous. An ill-defined dark nuchal stripe. Ears very short, the interior and base white or yellowish, the back dark sandy, tipped and edged anteriorly with black. Flanks paler than the back. A dark brown mark from the nape to behind the elbow. White hip-stripe well marked. Arms and legs white or light sandy-gray. Tail long; its proximal third sandy; the rest whitish, extreme tip blackish.

Dimensions.—Head and body about thirty-seven inches; tail about thirty-four inches.

Habitat.—North Queensland; Northern Territory; South-eastern New Guinea.

References.—Thomas, B.M. Catal. p. 42, pls. v. fig. 7 (*rhinarium*), vii. fig. 1 (*upper view of skull*), and x. fig. 5 (*fourth premolar*); Gould, Mamm. Austr. ii. pls. xxiv., xxv.

10. Macropus irma, *Jourdain, sp.* (1837).

(*Halmaturus manicatus*, Gould.)

Black-gloved Wallaby.

Size small; form slender and graceful. Rhinarium partly hairy between the nostrils. Fur thick and soft. General color above dark bluish-gray; below pale gray tinged with yellow or rufous. Face markings distinct; two dark whisker-marks; cheek-stripe yellow, continued backwards to the ear. Ears long, their backs and the crown of the head black; a dark nuchal stripe; inside of ears yellow, with a prominent black tip. A pale inconspicuous hip-stripe. Arms and outside of legs gray; hands, feet, and front of legs bright yellow; fingers and toes pure black. Proximal fourth and sides of tail gray; distal three-fourths above and below with a well defined crest of stiff black hairs; extreme tip sometimes white.

Dimensions.—Head and body about thirty-one inches; tail about twenty-nine.

Habitat.—Southern parts of West Australia.

References.—Thomas, B.M. Catal. p. 40, pl. x. fig. 6 (*rhinarium*); Gould, Mamm. Austr. ii. pls. xx., xxi.

11. Macropus parryi, *Bennett* (1834).

Parry's Wallaby.

Size medium; form slender and graceful. Fur soft, almost woolly. General color above clear gray with a bluish tinge; below, chin white, chest, belly, and inner sides of limbs grayish-white. Face markings distinct. Two dark whisker-marks. Cheek-stripe pure white, passing backwards to beneath the eye. A white nuchal stripe reaching to half-way down the neck, with a darker mark on each side of it. Ears long, white inside, basal half and extreme tips of outside brown, the rest white. Arms and legs gray, hands and feet becoming nearly or quite black on the digits. Tail very long, pale gray; an inconspicuous black or gray crest below the tip.

Dimensions.—Head and body about thirty-seven inches; tail about thirty-two inches.

Habitat.—Mountain Ranges of New South Wales and Queensland.

References.—Thomas, B. M. Catal. p. 39, pl. x. fig. 4 (*fourth premolar*); Gould, Mamm. Austr. ii. pls. xii., xiii.

12. Macropus dorsalis, *Gray, sp.* (1837).

Black-striped Wallaby.

Size medium; forms light and delicate. Rhinarium wholly naked. General color gray; rich rufous on the fore-quarters; below white or grayish-white. A narrow black line from the occiput to the centre of the back. Face-markings nearly obsolete; upper lip white; a white spot at the base of the outer edge of the ear. Back of ears rufous darkening towards the tips. A distinct white hip-stripe, Arms rufous; legs gray; fingers and toes becoming black towards their tips. Claw on the central hind toe shorter than usual. Tail gray; the extreme tip black.

Dimensions.—Head and body about thirty-two inches; tail about twenty-four inches.

Habitat.—Interior of New South Wales and Queensland.

References.—Thomas, B.M. Catal. p. 37, pls. v. fig. 5 (*rhinarium*) and x. fig. 3 (*fourth premolar*); Gould, Mamm. Austr. ii. pls. xxvi., xxvii.

13. Macropus greyi, *Gray, sp.* (1843).

Grey's Wallaby.

Size medium ; form slender and delicate. General color above grayish-fawn on the back, more rufous on the nape and back of the head; below pale gray tinged with rufous. Ears rufous behind, their edges blackish. Face-markings distinct. A black band bordering the naked rhinarium. A black whisker-mark from the nose to the eye, bordered below by a white cheek-stripe, which reaches nearly to the ear. An indistinct light hip-stripe. Arms, hands, legs, and feet white or yellowish, becoming abruptly black on fingers and toes. Central hind claws unusually slender and long. Tail very pale gray becoming lighter towards the tip; indistinct upper and lower crests of white hair on the distal half.

Dimensions.—Head and body about thirty-two inches; tail about twenty-nine inches.

Habitat.—South-eastern and South Australia.

References.—Thomas, B.M. Catal. p. 36, pls. vii. fig. 2 (*upper view of skull*) and ix. fig. 3 (*upper incisors*); Gould, Mamm. Austr. ii. pls. xviii., xix.

14. Macropus ruficollis, *Desmarest, sp.* (1817).

The Red-necked Wallaby.

Size medium; form slender. Rhinarium naked. General color above grayish-fawn, the back of the neck and the rump bright rufous; below white or grayish-white. Face-markings inconspicuous. Ears rather long, their backs rufous ; blacker towards the tip. Sometimes an indistinct whitish hip-mark. Hands and feet gray, grading into black on the digits. Tail gray above; white below, with an inconspicuous black pencil.

Dimensions.—Head and body about forty-two inches; tail about thirty inches.

Habitat.—Southern parts of Queensland, New South Wales, and Victoria.

References.—Thomas, B.M. Catal. p. 32, pls. v. fig. 4 (*rhinarium*) ix. fig. 2 (*upper incisors*), and x. fig. 2 (*fourth premolar*); Gould, Mamm. Austr. ii. pls. xiv., xv.

14a. M. ruficollis, var. bennetti, *Waterhouse* (1837).

Tasmanian Red-necked Wallaby.

Colors as in typical variety, but much more sombre in tone Fur much longer and thicker. Nape and rump dull rufous-brown; back of ears nearly black ; face-markings scarcely visible ; under parts dirty grayish-white ; tail darker gray.

Dimensions.—As in typical form.

Habitat.—Tasmania.

References.—Thomas, B.M. Catal. p. 34; Gould, Mamm. Austr. ii. pls. xvi., xvii.

15. MACROPUS UALABATUS, *Lesson & Garnot, sp.* (1826).

Common Scrub or Black-tailed Wallaby.

Size medium; form rather stout. Fur long, thick, and rather coarse. General color dark rufous-gray, the rufous predominating behind. Crown of head, round base of ear, outside of elbows, chin, chest, and belly pale rufous or yellow, varying in extent and intensity. Face-markings vague and indistinct. Ears short, colored like the top of head. A dark mark behind the elbow. Hands and feet brown, becoming black on the toes. Tail black.

Dimensions.—Head and body about thirty-three inches; tail about twenty-six inches.

Habitat.—Coast regions of New South Wales and Victoria.

References.—Thomas, B.M. Catal. p. 30, pls. ix. fig. 1 *(upper incisors)*, and x. fig. 1 *(fourth premolar)*; Gould, Mamm. Austr. ii. pls. xxi., xxii.

15a. M. UALABATUS, var. APICALIS, *Günther* (1874).

Queensland Scrub Wallaby.

Size and colors like those of the typical variety, but the fur shorter and coarser, and the markings more sharply defined. Brown mark on side of face continued through eye nearly to the ear, sharply separated from white whisker-mark. Rufous of lower back richer and brighter. Tail generally (?) tipped with white.

Dimensions.—As in typical form.

Habitat.—North-eastern Queensland.

References.—Thomas, B. M. Catal. p. 34; Günther, P.Z.S., 1874, p. 653, pl. lxxvii.

16. MACROPUS MAGNUS, *Owen* (1874).

Owen's Kangaroo.

External characters unknown.

Habitat.—Northern Territory.

References.—Thomas, B. M. Catal. p. 27, pl. vi. figs. 1 *(roof of mouth)*, and 2 *(two posterior molars)*; Owen, Phil. Trans. 1874, p. 247, pl. xx. figs. 12, 19, and 26 *(teeth)*.

Note.—This animal, which is only known from a single skull, may prove to be identical with the almost equally little-known *M. isabellinus*, of North-west Australia, of which only an imperfect skin is to be found in any Museum.

17. Macropus rufus, *Desmarest, sp.* (1822).

Great Red Kangaroo.

Size very large; form robust, in the female rather slender. Fur of back and sides short, close, and woolly, composed almost entirely of under fur, the direction variable, especially on the head. Rhinarium naked. General color above brilliant rufous in the male, bluish slaty-gray in the female; below white or pale gray with the fur coarse and straight. A black whisker-mark, with a whitish blotch below it. Ears gray or brown outside, whitish inside. Fingers and toes black; central hind claw short. Tail gray.

Dimensions.—Head and body about sixty-five inches; tail about forty-two inches.

Habitat.—Eastern, South-eastern, and South Australia.

References.—Thomas, B.M. Catal. p. 25, pls. v. fig. 3 *(rhinarium)* and vi. fig. 5 *(third molar)*; Gould, Mamm. Austr. ii. pls. vi., vii.

18. Macropus isabellinus, *Gould, sp.* (1841).

Isabelline Kangaroo.

Size large; fur of medium length, very soft and fine but not woolly. General color above rich foxy red; underside and limbs white. Front of neck pure white, sharply defined from the rufous nape by a ridge of opposed hairs. Tail rufous gray.

Dimensions.—About the same as those of *M. rufus*.

Habitat.—North-western Australia, and Islands off the coast.

References.—Thomas, B.M. Catal. p. 25.

19. Macropus robustus, *Gould* (1840).

Wallaroo.

Size large; form stout and heavy. Fur of medium length, rather thick and coarse. Rhinarium naked. General color above dark smoky-brown; below lighter. Nasal region and back of ears nearly black; lips, inside and base of ears white or pale gray. Arms, legs, and tail very dark brown, gradually becoming black distally. Central hind toe very short.

Dimensions.—Head and body about sixty inches; tail about thirty-six inches.

Habitat.—Mountain Ranges of Queensland, New South Wales, Victoria, and South Australia.

References.—Thomas, B.M. Catal. p. 22, pl. v. fig. 2 *(rhinarium)*; Gould, Mamm. Austr., ii. pls. x., xi.

20. Macropus antilopinus, *Gould, sp.* (1841).

Antilopine Kangaroo.

Size large; form stout and heavy. Fur very short, coarse, and straight; no under fur. Rhinarium large and naked. General color above rich rufous; below whitish. Face-markings absent. Ears short. Hands and feet rufous-brown, becoming black on the fingers and toes. Tail colored like the body, but rather darker at the extreme tip. Feet rather short; central hind claw very short.

Dimensions.—Head and body about fifty-six inches; tail about thirty-six inches.

Habitat.—Northern Territory.

References.—Thomas, B.M. Catal. p. 21, pl. vi. fig. 3 *(muzzle)*; Gould, Mamm. Austr. ii. pls. viii., ix.

21. Macropus giganteus, *Zimmermann, sp.* (1777).

(M. major, Shaw.)

Kangaroo.

Size very large; form robust. Fur short close, and rather woolly; variable in direction on the fore part of the body. Rhinarium almost entirely hairy. General color above grayish-brown; underside and inside of limbs whitish. A slight dark whisker-mark on the sides of the nose. Fingers and toes nearly black at their tips. Tail brown, gradually darkening to the extreme tip, which is black. Central hind claw long and strong.

Dimensions.—Head and body about sixty inches; tail about thirty-seven inches.

Habitat.—All Australia except the extreme north.

References.—Thomas, B.M. Catal. p. 15, pl. v. fig. 1 (*rhinarium*); Gould, Mamm. Austr. ii. pls. i., ii. *(M. major)*; iii., iv. *(M. ocydromus).*

21a. M. giganteus, var. fuliginosus, *Desmarest.*

Tasmanian Kangaroo.

Differs only from the typical form in the much longer, coarser, and darker fur, the pure white belly, the hands and feet grizzled-gray without black tips, and the terminal fourth of the tail being deep black.

Dimensions.—Much as in typical form.

Habitat.—Tasmania.

References.—Thomas, B.M. Catal. p. 19; Gould, Mamm. Austr. ii. pl. v.

21b. M. GIGANTEUS, var. MELANOPS, *Gould* (1842).

Black-faced Kangaroo.

Differs from the typical form only in the much smaller size, lighter build, and darker color. A brown patch on the face connecting the two dark whisker-marks. Arms and legs not paler than the body; fingers and toes black.

Dimensions.—Head and body about forty inches; tail about thirty inches.

Habitat.—Eastern and South-eastern, perhaps extending its range to Northern Australia.

References.—Thomas, B.M. Catal. p. 20.

Subclass III.—EUTHERIA.

The Eutherian Mammals are, as their name implies, by far more specialized than either of the preceding Subclasses. The name here adopted was bestowed upon them by Prof. Huxley in exchange for the older terms MONODELPHIA *(one wombed)* and PLACENTALIA, in order to keep the nomenclature of the three Subclasses as uniform as possible, and in view of the fact that equivalent names for the remaining Subclasses, namely, DIDELPHIA *(two wombed)* for the Marsupials, and ORNITHODELPHIA *(bird-wombed)* for the Monotremes were manifestly incorrect and therefore misleading. They differ from other Mammals in that the fœtus is nourished for a considerable, but varying length of time within the uterus of the mother, and when brought forth is in such an advanced stage of growth as to be able of its own volition to draw nourishment from the teat, without the intervention of muscles specially adapted for forcing the milk into its mouth, as in the Marsupials.

In their mode of life the Eutherian Mammals show a great divergence, much more so than the Metatherian Mammals do, some, for instance, as the SIRENIA *(Dugong, &c.)*, and especially the CETACEA *(Whales, Dolphins, &c.)* being fitted for a purely aquatic life; others like the PINNIPEDIA *(Seals and Walruses)* for a mixed aquatic and terrestrial existence, the former predominating; others again like the CHIROPTERA *(Bats, and Flying-foxes)* for an aërial existence; while the habits, food, &c of the purely terrestrial forms are diverse in the extreme, and necessitate many and startling changes in their form, structure, dentition, organs of digestion &c.

In order to meet these diverse conditions of existence it became necessary to divide this large and complex Subclass into various sections, technically known as "Orders," of which scientists now recognise ten, as at the present time existent on our planet, these being classified as follows:—(i.) EDENTATA, the Sloths, Armadillos

Anteaters, &c.; (ii.) SIRENIA, the only existing species of which are the Manatees and Dugongs; (iii.) CETACEA, the Baleen and Sperm Whales, Narwhal, Dolphins, &c.; (iv.) INSECTIVORA, the Hedgehogs, Moles, Shrews, &c.; (v.) CHIROPTERA, the Flying-Foxes, Bats, Vampyres, &c.; (vi.) RODENTIA the Porcupines, Rats, Rabbits, &c.; (vii.) UNGULATA, the Elephants, Swine, Deer, Cattle, Sheep, Horse, &c., by far the most important Order; (viii.) CARNIVORA, the Lion, Wolf, Weasel, Walrus, Seal, &c.; (ix.) QUADRUMANA, the Monkeys, Apes, Lemurs, &c.; and (x.) PRIMATES, Man.

Of these ten Orders only five, the second, third, fifth, sixth, and eighth have to be dealt with here as Australian, four of the others not having as yet been recorded from this Subregion, while Man is relegated to a different—the anthropological—branch of the science.

The range of this Subclass is, as may be supposed, cosmopolitan no region having been visited by man, whether the ice-bound wastes of the arctic seas, or the burning sands and miasmatic swamp-forests of the tropics, in which widely different forms of mammalian life, from the Rein-Deer and Musk-Ox, the White Bear and the Walrus of the inhospitable polar shores on which so many of the bravest and best of the intrepid heroes of our Anglo-Saxon race have left their sad and but surmisable record of imperishable fame, to the Aye-Aye and the Armadillo, the Tapir and the Gorilla of lands which teem with so exuberant a life as to be actually more deadly to man than the barren, the shuddering silences of the long winter night of the polar seas.

In point of numbers and importance the Eutherian Mammals greatly exceed the two preceding divisions of the class, except in Australia, this wondrous relic of an older era in our planet's history, the latest and the most marvelous of our discoveries. Leaving the marine mammals—which are naturally cosmopolitan—for the present out of the question, the truth of this assertion may be seen at a glance by the fact that in Australia and its attendant islands only about seventy species of terrestrial Eutherian Mammals,—one of which, the Dingo, is more than doubtfully indigenous—have been differentiated with any degree of certainty, and, with the exception of the Australian Water-Rats *(Hydromys)* and the more closely allied genera, none are of any special interest, while not a single species is of any commercial value whatever. As an illustration of the poverty of the Australian fauna in this respect it is only necessary to call the attention of my readers to the obvious fact that all domesticated mammals, one at least of which has placed Australia in the proud position which she now holds, have their origin in far distant lands. As a set-off to this, from a naturalist's point of view, unsatisfactory state of affairs we can of course point with pride to the great

preponderance of the Marsupial Group in these Colonies, no less than ninety-three species, exclusive of nine well-marked varieties, belonging solely to the fauna of Australia and its outlying islands, while three (*Macropus agilis*, *Dactylopsila trivirgata*, and *Phalanger maculatus*) are common to it and the Papuasian or Austro-Malayan sub-regions; the number of known Marsupials being but one hundred and fifty-one, with twelve recognizable varieties, it therefore follows that Australia possesses almost two-thirds of the total.

Order I.—SIRENIA.

Head rounded, not disproportionate in size as compared with the trunk, from which it is inconspicuously separated by any externally visible neck. Nostrils valvular, separate, placed above the fore part of the obtuse truncated muzzle. Eyes very small, with a well developed nictitating membrane. Ear without pinna. Mouth small or moderate, with tumid lips beset with stiff bristles. General form of body depressed and fusiform. No dorsal fin. Tail flattened and horizontaly expanded. Fore limbs paddle-shaped, the digits enveloped in a common cutaneous covering. No trace of hind limbs. Skin wrinkled, rugose, naked, or with fine hairs sparsely scattered over it. Clavicles absent. Pelvis rudimentary.

The Sirenians are inhabitants of bays, estuaries, lagoons, and large rivers, in the shallow waters of which they find abundance of the marine algæ and fresh-water grasses on which entirely they feed. They are as a rule gregarious, are slow and inactive in their movements, and in disposition mild, inoffensive, and apparently without much intelligence, for which latter reason they are within a measurable distance of total extinction, being valuable for their flesh as food, and for their hides, but especially for the excellent oil which is extracted from the thick layer of fat immediately underlying the cuticle, as a fact they are already becoming very scarce and difficult to obtain in all settled districts. Members of the two existing genera, *Manatus* and *Halicore*, are natives of the tropical shores of Eastern America and the West Indies, Africa, Asia, and Australia, but the genus *Rhytina*, from Behring Straits, a much larger animal than either of the others, is supposed to have been exterminated through the agency of man within the last hundred and twenty-three years, but it is reported (Nordenskiöld, Voyage of the Vega) to have been seen in its original home so late as 1854.

During the Miocene and early Pliocene epochs Sirenians abounded in the coastal waters of Europe and North America, and a species has also been discovered in the nummulitic limestone of the Mokattam Hills near Cairo.

Genus I.—HALICORE, *Illiger* (1811).

Incisors in the male large, tusk-like, with bevelled off cutting edges, and the roots provided with persistent pulp cavities; in the female not penetrating the gum. Not more than three molars in each ramus in use simultaneously. Limbs without nails. Tail fin lunate. Head in front of the eyes bent abruptly downwards.

Vertebræ.—C. 7, D. 15 - 18, L. & C. 30 = 52 – 55.

Dentition.—I. $\frac{2}{0}$, C. $\frac{0}{0}$, P. $\frac{0}{0}$, M. $\frac{5 \text{ or } 6}{5 \text{ or } 6} \times 2 = 22$ to 26.

1. Halicore dugong, *Gmelin, sp.* (1788).

Dugong.

Skin thick and smooth with a few scattered hairs; upper lip large, its lower edge obliquely truncated, tuberculated, and bristly. Flippers short, thick, and fleshy. Colors, above slaty- or brownish-black, below lighter.

Habitat.—Northern Australia, descending on the eastern coast as far south as Moreton Bay; from New Guinea through Malaysia and along the southern shores of Asia to the Red Sea; East coast of Africa, and Mauritius.

Dimensions.—Total length up to eight feet.

References.—Gray, B.M. Catal. Seals and Whales, p. 261; Scott, Seals and Whales, p. 52.

Note.—For many years the idea was prevalent that the Dugongs were able to come on shore at will for the purpose of browsing on grasses and other terrestrial plants; but a cursory examination of the weakness of the fore-limbs, coupled with the total absence of even the internal rudiments of hind limbs, should have been sufficient to have at once dispelled a view so incompatible with the structure of the animal. By some the flesh is said to be excellent, while others maintain that it is almost inedible, a difference for which it is easy to account if the sex and age of the individual eaten be taken into consideration, or perhaps, though hardly likely with a class of animals whose diet is necessarily so restricted, to the nature of food consumed. There is, however, no such diversity of opinion as to the excellent quality of the oil expressed from the subcuticular fat of the Dugong, which is with one accord pronounced to be pure, clear, free from disagreeable odor, and further more, when properly prepared, to possess many, if not all, of the remedial properties of cod-liver oil. Dugongs are much more strictly marine than Manatees, and their food is therefore chiefly restricted to sea-water algæ.

These animals have been by some systematists divided into three species, (the basis, apparently, of this opinion being mainly the difference of locality) namely, *H. tabernaculi* from African, *H.*

dugong from Indian, and *H. australis* from Australian seas, but no valid characters by which to distinguish the various forms appear to have been adduced.

Order II.—CETACEA.

Body fusiform, passing anteriorly into the head without any distinct neck, posteriorly tapering off gradually to the base of the tail, which is provided with a pair of lateral, pointed expansions of skin, forming together a horizontally placed triangular propelling organ, notched in the middle line behind. Head generally large, sometimes more than one-third of the total length ; aperture of mouth always wide, bounded by stiff immobile lips. Fore limbs modified into flattened ovoid paddles, encased in a continuous integument. No external signs of hind limbs. General surface of skin smooth and glistening, devoid of hair. A compressed median dorsal fin almost always present. Eye small ; no nictitating membrane nor true lachrymal apparatus. Auditory opening consisting of a minute aperture in the skin situated a short distance behind the eye, without vestige of pinna. Nostrils opening separately or by a single crescentic valvular aperture near the vertex. Teeth generally present but very variable in number, of simple, uniform character, having conical, compressed crowns, and single roots, and never preceded by milk teeth. Among the *Mystacoceti* the teeth are absent (see p. 65). No clavicles. Immediately beneath the skin and intimately connected with it, is a thick layer of fat, held together by a dense mesh of areolar tissue constituting the blubber, which serves the purpose of the hairy covering of other mammals in retaining the heat of the body.

Cetaceans abound in all seas and in some of the larger rivers of Asia, such as the Ganges, Indus, and Irrawaddy, and of South America where the "*Inia*" of the natives of Bolivia ascends the Amazon even to its remote sources among the Peruvian Lakes. Necessarily from the structure of their limbs they are purely aquatic mammals and once stranded, from any cause whatever, are absolutely at the mercy of their smallest enemy. For the purpose of respiration it is necessary that they should rise frequently to the surface, and since this necessitates a frequent upwardly rising motion and a subsequent plunging downwards the tail is therefore expanded horizontally, not vertically as in Fishes where no such motion is requisite. For an equally beneficent reason the respiratory orifice is placed on the highest point, or vertex, of the head, with the purpose of enabling the animal to breathe without trouble while at the same time exposing the smallest possible portion of its body above the surface, where it might necessarily expect to meet with its most dangerous foes and where its powers of vision, such as they are, would be hopelessly

handicapped. The prevalent idea that Whales spout "water" from the blowhole is erroneous, the so-called "spouting" or "blowing" being caused merely by the forcible expulsion of the air taken at the last inspiration, and which, charged by the action of the lungs with humid vapor, changes, upon contact with the colder air, into a jet of combined steam and spray. All the Cetaceans are predacious, living entirely on animal food of one form or another, this consisting of fishes, small swimming and floating crustaceans, pteropods, jelly fish *(Medusæ)*, and cephalopods, the latter forming almost the sole food of the Sperm Whales, without doubt the largest of living animals, and from the non-assimilization of certain portions of these Cephalopods the valuable substance known as "*ambergris*" is derived; one genus *(Orca)*, however, habitually feeds also on the larger mammals, such as Seals, Porpoises, Dolphins, and even attacks the larger Whales. With few exceptions they are timid and inoffensive, active in their movements, and markedly affectionate towards one another, especially in the case of the mother to her young, which, if harpooned, she will never desert, even when she herself receives the fatal stroke. The young number generally one, never more than two, at a birth, and the mother at the time of gestation seeks the protection of shallow sheltered bays and inlets, and is therefore all the more liable to these murderous attacks at the very time that the law should most stringently and sternly protect her. Most of the species of Cetaceans are gregarious, in the case of some of the *Delphinidæ* as many as thousands hunting in a single pack.

The earliest fossil Cetacea, of whose organization anything like a complete knowledge is evident, are the Zeuglodons of the Eocene period.

Suborder I.—Mystacoceti.

Whale-bone Whales.

Teeth never functionally developed, disappearing before the birth of the fœtus. Palate provided with plates of baleen, (whalebone). Skull symmetrical. Nasal bones forming a roof to the anterior nasal passages, which are directed upwards and forwards. External openings of nostrils distinct from each other, longitudinal. Olfactory organ distinctly developed. Maxilla produced in front of, but not over, orbital process of frontal. Lachrymal bones small, distinct from the jugal. Tympanic bone anchylosed to the periotic, which is attached to the base of the cranium by two strong diverging processes. Rami of mandible arched outwards, their anterior ends meeting at an angle, and without true symphysis. Ribs articulating only with the transverse processes of the vertebræ. Sternum composed of a single piece, and articulating with a single pair of ribs only. No ossified sternal ribs. A short conical cœcum.

Baleen, more commonly but erroneously called "*whale-bone*," consists of numerous transversely placed flattened horny laminæ, numbering between three hundred and four hundred on either side of the palate. Each of these laminæ is composed of many soft vascular papillæ, circular in outline, each of which is surrounded by concentrically arranged epidermic cells, the whole being bound together by other cells of a similar character, which constitute the smooth cortical surface of the blade, erroneously considered to be enamel, and which, by the disintegration of its free margin allows the individual fibres to become loose and assume a hair-like appearance. The baleen only makes its appearance after the birth of the young Whale, these in the fœtal state possessing numerous minute calcified teeth which are absorbed before birth. Its function is to strain the water from the small marine animals on which the whales subsist and at the same time prevent the escape of the enclosed prey.

Family I.—BALÆNIDÆ.

Characters similar to those of the Suborder.

Genus I.—BALÆNA, *Linnæus* (1735).

Skin of throat smooth. Head very large. No dorsal fin. Fore limb short, broad, pentadactylous. Baleen very long and narrow, highly elastic, black. Cervical vertebræ united into a single mass. Scapula high, with a distinct coracoid and coronoid process.

Vertebræ.—C. 7, D. 14, L. 10, Cd. 23; total 54.

1. Balæna australis, *Desmoulins* (1822).

Southern Right Whale.

General color black or blackish-gray; the anterior part of the lower jaw, and part of the throat and belly white.

Dimensions.—Attains to a length of from sixty to seventy feet.

Habitat.—Atlantic, Pacific, and Indian Oceans south of the tropics.

References.—Gray, B.M. Catal. Seals and Whales, p. 91; Scott, Seals and Whales, p. 136.

Note.—The food of the Right Whales consists principally of minute molluscous and crustaceous animals.

Genus II.—NEOBALÆNA, *Gray* (1871).

Skin of throat smooth. A small falcate dorsal fin. Fore limb tetradactylous, the pollex absent. Skull rather depressed; brain cavity nearly as long as the beak, depressed, much expanded on the sides, with a very deep notch on the middle of each side over the condyles of the lower jaw, and with a subtriangular crown-plate.

Nose as broad as the expanded brain cavity at the base, regularly attenuated to a fine point in front, and slightly arched downwards. Lower jaw laminar, compressed, and high; the upper edge thin and inflexed on the greater part of its length, erect in front; the lower edge inflexed in front the rest of the edge simple. Baleen elongate, slender, several times as long as broad, with a fringe of a single series of fine fibres; enamelled surface smooth and polished, thick. Cervical vertebræ united into a single mass. Ribs expanded and flattened. Scapula low and broad, with well developed coracoid and coronoid process.

Vertebræ.—C. 7, D. 17, L. 3, Cd. 16 = 43.

1. Neobalæna marginata, *Gray*, *sp.* (1866).

Pigmy Right Whale.

Head about one-fourth of the total length. Baleen pale yellow with a dark margin. Although two fresh specimens have recently come ashore at or near Adelaide, S. A., no measurements or descriptions of the external characters appear to have been taken, and until Dr. Gray's diagnosis of the genus, which is taken solely from photographs supplied by Dr. Hector, can be supplemented by original observations, no reliable description of the external characters is possible.

Dimensions.—Said to be up to twenty feet.

Habitat.—Southern Australian and New Zealand Seas.

Reference.—Gray, Suppl. to B. M. Catal. Seals and Whales, p. 40, figs. 1 *(side view of skull)* and 2 *(top view of ditto)*.

Genus III.—MEGAPTERA, *Gray* (1846).

Skin of throat plicated. Head of moderate size. A low dorsal fin present. Fore limbs very long and narrow, about a fourth of the total length of animal, tetradactylous, the phalanges very numerous. Baleen short and broad. Cervical vertebræ free. Scapula with the acromion and coracoid process absent or rudimentary.

Vertebræ.—C. 7, D. 14, L. 10 or 11, Cd. 21; total 52 or 53.

1. Megaptera boops, *Fabricius* (1780).

Hump-back Whale.

Back and sides black; belly yellowish-white, sometimes with irregular black spots. Anterior and posterior edges of pectoral fin irregularly notched.

Dimensions.—Up to at least sixty feet.

Habitat.—All seas except the tropical and subtropical.

References.—Gray, B.M. Catal. Seals and Whales, p. 126, fig. 19 *(fifth cervical vertebra)* and p. 128, fig. 20 *(ear-bones)*; Scott, Seals and Whales, p. 128.

Note.—Gray's *M. novæ-zealandiæ* may be a good species, but, according to Prof. Flower, no distinctive characters have as yet been defined.

Genus IV.—BALÆNOPTERA, *Lacépède* (1804).

Skin of throat plicated. Head small, flat, and pointed in front. Body long and slender. A small falcate dorsal fin. Fore limbs small, narrow, and pointed; tetradactylous. Baleen short and coarse. Cervical vertebræ free. Scapula low and broad with the acromion and coracoid process large.

Vertebræ.—C. 7, D. 12, L. 13, Cd. 16; total 48.

1. Balænoptera huttoni, *Gray* (1874).

Sulphur-bottom.

Dark green above, shading off gradually to yellowish-white below. Baleen yellow with a narrow black margin.

Dimensions.—Up to thirty feet?

Habitat.—Seas of New South Wales and New Zealand.

References.—Gray, Ann. Nat. Hist. (4) 1874 xxxi. p. 316, pl. xvi. *(animal)* and p. 450, pl. xviii.

Note.—This is possibly identical with the Northern *B. rostrata.*

Suborder II.—Odontoceti.

Calcified teeth always present after birth, generally numerous, but sometimes a limited number, or even in rare cases none, are functional. No baleen. Upper surface of skull more or less asymmetrical. Nasal bones in the form of nodules or flattened plates, closely applied to the frontals, and not forming any part of the roof of the narial passage, which is directed upwards and backwards. Olfactory organ rudimentary or absent. Posterior end of maxilla expanded, covering the greater part of the orbital plate of the frontal bone. Lachrymal bone either inseparable from the jugal, or, when distinct, very large and forming part of the roof of the orbit. Tympanic bone not anchylosed to the periotic, which is usually attached to the skull by ligament only. Rami of mandible nearly straight, much expanded in height posteriorly, with a wide funnel-shaped aperture to the dental canal, and coming in contact in front by a flat surface of variable length, always constituting a true symphysis. Several of the true ribs with well-developed capitular processes, which articulate with the bodies of the vertebræ. Sternum almost always composed of several pieces, placed one behind the other, with which several pairs of ribs are always connected by the intervention of well-developed cartilaginous or ossified sternal ribs. External respiratory aperture single, the two nostrils uniting before they reach

the surface, usually in the form of a transverse, subcrescentic, valvular opening, situated on the top of the head. Hand always pentadactylous, the first and fifth digits however but little developed. No cœcum, except in *Platanista*.

Family I.—PHYSETERIDÆ.

No functional teeth in the upper jaw. Mandibular teeth various, often few in number. Bones of the cranium raised so as to form an elevated prominence behind the nostrils. Pterygoid bones thick, not involuted to form the outer wall of the post-palatine air-sinuses. Transverse processes of the arches of the dorsal vertebræ, to which the tubercles of the ribs are attached, ceasing abruptly near the end of the series, and replaced by processes on the vertebræ at a much lower level, not on a line or serially homologous with them, but anteriorly with the heads of the ribs, posteriorly with the transverse processes of the lumbar vertebræ. Costal cartilages not ossified.

Subfamily I.—PHYSETERINÆ.

Numerous teeth in the mandible which are not set in distinct bony alveoli, but in a long groove imperfectly divided by partial septa, and held in place by the strong fibrous gum which surrounds them. No distinct lachrymal bone. Cranium strikingly asymmetrical in the region of the narial apertures, in consequence of the left opening greatly exceeding the right in size.

Genus I.—PHYSETER, *Linnæus* (1748).

Upper teeth of uncertain number, embedded in the gum; mandibular teeth from twenty to twenty-five in each ramus, stout, conical, recurved, and pointed, without a coating of enamel. Upper surface of cranium concave. Rostrum greatly elongated, tapering gradually to the apex from its broad base. Mandible very long and narrow, the symphysis more than half the length of the ramus. Atlas free, the remaining cervical vertebræ united into a single mass. Eleventh pair of ribs rudimentary. Head about one-third of the length of the body, very massive, high, and truncated. Nasal opening single, longitudinal, slightly to the left of the median line of the head. Fore limb short, broad, and truncated. Dorsal fin a mere low protuberance.

Vertebræ.—C. 7, D. 11, L. 8, Cd. 24; total 50.

1. PHYSETER MACROCEPHALUS, *Linnæus* (1766).

Sperm Whale; Cachalot.

Body above very dark, occasionally black, fading gradually on the sides and belly, silvery gray on the chest.

Dimensions.—Up to eighty-five feet at least.

Habitat.—Cosmopolitan.

References.—Gray, B.M. Catal. Seals and Whales, p. 202, fig. 54 *(side view of skull)*; Scott, Seals and Whales, p. 111.

Genus II.—KOGIA, *Gray* (1866).

Upper teeth absent or reduced to a rudimentary pair in front. Mandibular teeth nine to twelve in each ramus, long, slender, recurved, and pointed, with a coating of enamel. Upper surface of the cranium concave. Rostrum not longer than the cranial portion of the skull, broad at the base and rapidly tapering to the apex. Mandible with symphysis less than half the length of the ramus. All the cervical vertebræ united. Head about one-sixth of the length of the body, obtusely pointed in front. Spiracle crescentic, to the left of the median line. Pectoral fins obtusely falcate. A triangular dorsal fin.

Vertebræ.—C. 7, D. 13 or 14, L. 9, Cd. 21; total 50 or 51.

1. KOGIA BREVICEPS, *Blainville, sp.* (1838).

Short-headed Sperm Whale.

Black above, yellowish below.

Dimensions.—Up to eleven feet.

Habitat.—Australia; Timor; Cape of Good Hope.

References.—Gray, B.M. Catal. Seals and Whales, p. 217, fig. 56 *(skull and lower jaw)* and p. 218; Scott, Seals and Whales, p. 208; Wall, Mem. No. 1, Austr. Mus. (1851).

Subfamily II.—ZIPHIINÆ.

Mandibular teeth rudimentary and concealed in the gum, with the exception of one, very rarely two, pair which may be largely developed, especially in the males. A distinct lachrymal bone. Spiracle single, crescentic, and median. Pectoral fin small, ovate, all five digits moderately developed. A small obtusely falcate dorsal fin, situated considerably behind the middle of the back. Longitudinal grooves on the skin of the sides of the throat nearly united in front, but divergent behind.

Genus III.—HYPEROÖDON, *Lacépède* (1803).

Mandible with a small, conical, pointed tooth at the apex of each ramus, concealed by the gum. Skull with the upper ends of the premaxillæ rising suddenly behind the nares to the vertex; the right larger than the left. Anteorbital notch distinct. Mesethmoid but slightly ossified. All the cervical vertebræ united.

Upper surface of head in front of spiracle very prominent and rounded, rising abruptly from the small, distinct snout.

Vertebræ.—C. 7, D. 9, L. 10, Cd. 19 ; total 45.

1. Hyperoödon planifrons, *Flower* (1882).

Southern Bottlenose Whale.

This species is only known from a mutilated skull found on the beach of Lewis Island, Dampier's Archipelago, and described at length by Prof. Flower in the Proceedings of the Zoological Society for 1882, p. 392, who figures the upper surface and the side view of the skull.

Genus IV.—MESOPLODON, *Gervais* (1850).

A mandible with a much compressed and pointed tooth on each side, variously situated, but generally at some distance behind the apex ; its point directed upwards and often somewhat backwards, occasionally developed to a great size. Skull not greatly differing from that of *Hyperoödon*. Anteorbital notch not very distinct. Mesethmoid cartilage ossified in adults, coalescing with the surrounding bones of the rostrum, which is long and narrow. Two or three anterior cervicals united, the remainder usually free.

Vertebræ.—C. 7, D. 10, L. 10 or 11, Cd. 19 or 20; total 46 to 48.

1. Mesoplodon layardi, *Gray, sp.* (1865).

Long-toothed Whale.

Mandibular tooth strongly compressed, with the apex everted, and seated upon a flat strap-like base, which grows upwards, backwards, and finally inwards, closing in adult males (?) over the upper jaw, and sometimes actually meeting. Lateral basirostral groove slight. Premaxillary foramen level with the maxillary.

Dimensions.—Up to about fifteen feet.

Habitat.—New South Wales ; Cape Seas.

References.—Gray, B.M. Catal. Seals and Whales, p. 353, fig. 72 a., b. (*skull and lower jaw*); c. (*mandibular teeth from the front*); Scott, Seals and Whales, p. 117.

Note.—In Mr. Krefft's MSS. occurs a notice of a Ziphiid Whale, which he names *M. thomsoni*, but which is probably the female of this species. It was stranded at Little Bay, near Sydney.

2. Mesoplodon densirostris, *Blainville, sp.* (1817).

Massive-toothed Whale.

Mandibular tooth with the apex directed vertically, placed on a very massive base, which is implanted in a greatly expanded alveolar margin of the jaw, not found in any other species. Lateral

basirostral groove deep. Premaxillary foramen behind the maxillary.

Dimensions.—Up to about fifteen feet.

Habitat.—Lord Howe Island; Seychelles.

References.—Gray, Suppl. B.M. Catal. Seals and Whales, p. 102, fig. 103 *(skeleton)*; Scott, Seals and Whales, p. 118.

3. Mesoplodon grayi, *Haast, sp.* (1876).

Small-toothed Whale.

Mandibular tooth small, triangular, vertical, opposite posterior edge of symphysis; a series of small conical teeth set in the gum of the upper jaw, commencing opposite the lower tooth and extending nearly to the gape of the mouth. Lateral basirostral groove deep. Back black getting a little lighter near the tail, where it assumes a dark slate tint; below reddish-brown.

Dimensions.—Up to eighteen feet.

Habitat.—New South Wales; New Zealand.

References.—Haast, Trans. N.Z Institute 1876, ix. p. 450, pl. xxvi. fig. 3 *(side view of skull)*; Flower, Trans. Zool. Soc. x. pls. lxxi., fig. 2 *(upper view of skull)*, lxxii. fig. 2 *(side view of ditto)*, and lxxiii. figs. 1 *(skeleton)* and 2 *(sternum)*.

Family II.—DELPHINIDÆ.

Teeth usually numerous in both jaws. Symphysis of mandible short or moderate, never exceeding one-third of the length of the ramus. Lachrymal bone not distinct from the jugal. Anterior ribs attached to the transverse processes of the dorsal vertebræ by the tubercle, and to the bodies of the vertebræ by the head; the latter attachment lost in the posterior ribs. Sternal ribs firmly ossified. External respiratory aperture transverse and crescentic, the horns of the crescent pointing forwards.

Genus I.—DELPHINAPTERUS, *Lacépède* (1804).

Pterygoid bones very small, not meeting in the middle line, approaching each other posteriorly. Cervical region comparatively long, all the vertebræ distinct or with irregular unions towards the middle of the series. Fore limb small, short, and broad; second and third digits nearly equal, the fourth slightly shorter. No dorsal fin.

Vertebræ.—C. 7, D. 11, L. 6, Cd. 26 = 50, subject to individual modifications.

Dentition.—$\frac{x}{x}$ to $\frac{0}{10}$.

1. Delphinapterus kingi, *Gray* (1827).

Southern (White ?) Whale.

A skull of a Dolphin, generically inseparable from the *D. leucas* of the Arctic Seas is in the British Museum, said to be from the coast of New Holland, and was described by Dr. Gray under the above name. No other specimen has been obtained.

References.—Gray, B. M. Catal. Seals and Whales, p. 309, and Suppl. p. 95. ?

Genus II.—ORCA, *Gray* (1846).

Pterygoid bones of normal form, but not quite meeting in the median line. First, second, and sometimes the third cervical vertebræ united, the rest free. Fore-limb large, ovate, nearly as broad as long. Dorsal fin very high and pointed, situated near the middle of the back. Anterior part of the head very broad and depressed.

Vertebræ.—C. 7, D. 11 or 12, L. 10, Cd. 23 = 51 or 52.

Dentition.—About $\frac{1-2}{1-2}$, occupying nearly the whole length of the beak, very large and stout, with conical, recurved crowns, and large roots, expanded laterally, and flattened or rather hollowed on their anterior or posterior surfaces.

1. Orca gladiator, *Bonnaterre* (1789).

Killer.

Black above, shading into white on the abdomen, with a more or less developed white patch above and somewhat behind the eye.

Dimensions.—Males up to twenty feet; females much smaller.

References.—Gray, B.M. Catal. Seals and Whales, p. 279; Scott, Seals and Whales, p. 88.

Note.—These are powerful and rapacious animals frequenting all seas from Greenland to Tasmania; many species have been described but no specific differential characters have been clearly defined.

Genus III.—PSEUDORCA, *Reinhardt* (1862).

First to sixth or seventh cervical vertebræ united. Bodies of the lumbar vertebræ elongated. Fore limb of moderate size, narrow, and pointed. Dorsal fin situated near the middle of the back, of moderate size, falcate. Head in front of blow-hole high and compressed anteriorly. Snout truncate.

Vertebræ.—C. 7, D. 10, L. 9, Cd. 24 = 50.

Dentition.—About $\frac{8}{10}$, their roots cylindrical.

1. Pseudorca crassidens, *Owen* (1846).

Tasmanian Killer.

Black above, whitish below.

Dimensions.—Same as preceding species.

Habitat.—Coast of Tasmania, New South Wales, Lord Howe Island.

References.—Gray, B.M. Catal. Seals and Whales, p. 80; Scott, Seals and Whales, pp. 91, 92.

Genus IV.—GLOBICEPHALUS, *Lesson* (1842).

Pterygoid bones of normal form, meeting or very nearly so in the median line. Upper surface of beak broad, flat, and concave in front of the nostrils. Premaxillæ as wide, or wider, at the middle of the beak as at its base. Bodies of the five or six anterior cervical vertebræ united.

Vertebræ.—C. 7, D. 11, L. 12 to 14, Cd. 28 or 29; total 58 or 59.

Dentition.—$\frac{11-11}{11-11}$ to $\frac{12-12}{12-12}$, rarely $\frac{14-14}{14-14}$; slightly curved at the tips.

1. Globicephalus melas, *Traill* (1809).

Ca'ing or Pilot Whale.

Smooth shining jet black above, paler below, with a white stripe along the throat and abdomen.

Dimensions.—Up to twenty-five feet.

Habitat.—Seas beyond the tropics; Tasmania.

References.—Gray, B.M. Catal. Seals and Whales, p. 314, and Suppl. p. 83; Scott, Seals and Wales, pp. 99, 100, 139.

Genus V.—DELPHINUS, *Linnæus* (1776).

Beak long and narrow, greatly exceeding the brain cavity in length, its basal width about one-third of its length. Forehead rounded. Dorsal fin falcate, situated on the middle of the back. The two anterior cervical vertebræ united, the rest free. Palate with lateral grooves.

Vertebræ.—C. 7, D. 12 - 14, L. & Cd. 54; total 73 - 75.

Dentition.—$\frac{4\,0}{4\,0}$ - $\frac{6\,0}{6\,0}$.

Note.—Prof. Flower (P.Z.S. 1883, p. 502) appears to consider the four following species as forms of a single widely disseminated one.

1. Delphinus delphis, *Linnæus* (1766).

Common Dolphin.

Black above; sides gray; beneath white.

Habitat.—Cosmopolitan ? Tasmania *(Flower)*.

Dimensions.—Total length generally from six to eight feet, sometimes as much as ten feet.

References.—Gray, B.M. Catal. Seals and Whales, p. 242; Scott, Seals and Whales, p. 72.

2. DELPHINUS NOVÆ-ZEALANDIÆ, *Quoy & Gaim.* (1832 – 4).

New Zealand Dolphin.

Teeth $\frac{4\ 5}{4\ 4}\cdot\frac{4\ 5}{4\ 4}$. Body rounded in front, tapering behind, becoming much compressed and carinated above from about half-way between the end of the dorsal and the caudal fins; snout narrow, cylindrical, depressed above, pointed in front. Upper part of body glossy rich black to half-way between dorsal and tail, beyond which the entire body is dark slate color; edge of upper jaw, lower jaw, and belly dull whitish; pectorals blackish above, whitish below; dorsal dull whitish or leaden-gray in the middle, the margins darker; eye margined with black, from which a narrow black white-edged band extends forwards to join the black of the head; a large dull ochraceous patch, tapering behind, from the eye to beneath the hinder margin of the dorsal. Palate deeply concave along each side behind. *(McCoy.)*

Dimensions.—Total length up to at least seven feet.

Habitat.—Southern coasts of Australia; Tasmania; New Zealand.

References.—Gray, B.M. Catal. Seals and Whales, p. 246; Quoy & Gaim. Voy. Astrolabe, Mamm. pl. xxviii. fig. 1; McCoy, Prodr. Zool. Vict. dec. iii. pl. xxii.

3. DELPHINUS FULVIFASCIATUS, *Hombr. & Jacq.* (1842 *et seq.*).

Dusky-banded Dolphin.

Teeth $\frac{4\ 7}{4\ 4}\cdot\frac{4\ 7}{4\ 4}$. Blackish; sides of back fulvous; throat and beneath white; beak, orbit, streak from angle of mouth to pectoral fin blackish. Palate deeply channeled on each side behind.

Habitat.—Tasmania.

References.—Gray, B.M. Catal. Seals and Whales, p. 253, and Suppl. p. 68; Hombr. & Jacq. Voy. Dumont d'Urville, pls. xxi. fig. 1 and xxiii. figs. 1, 2.

4. DELPHINUS FORSTERI, *Gray* (1845).

Forster's Dolphin.

Teeth $\frac{4\ 4}{4\ 4}\cdot\frac{4\ 4}{4\ 4}$. Body round, thickest behind; pectoral tapering at both ends; head rounded, shelving in front, beaked; beak straight, pointed, cylindrical, depressed, attenuated and blunt at the tip. Above dark rust color, beneath dirty white.

Habitat.—Tasmania ; New South Wales.

Dimensions.—Total length to eight feet at least.

References.—Gray, B.M. Catal. Seals and Whales, p. 248, and Suppl, p. 69 ; Scott, Seals and Whales, p. 76.

Note.—The coloration agrees with that of a herd of large Dolphins seen off Port Stephens by the author, individuals of which while racing the steamer were frequently within less than ten feet of the lookers-on ; one specimen was shot, upon which the whole scattered herd instantly disappeared.

Genus VI.—TURSIOPS, *Gervais* (1855).

Form stout. Beak short, distinctly marked off from the prenarial adipose elevation by a V-shaped groove. Pectoral fins lanceolate ; dorsal fin high and falcate. No lateral grooves on the palate. Beak tapering moderately from base to apex. Pterygoid bones united in the median line. Symphysis of lower jaw short. Teeth large, numbering from 21 to 25 on each ramus of each jaw.

Vertebræ.—C. 7, D. 13, L. 17, Cd. 27, = 64.

Note.—Gray's generic name "*Tursio*" (1846) having been used by Wagler sixteen years previously for a very distinct Cetacean is inadmissable.

1. Tursiops catalania, *Gray, sp.* (1862).

Southern Bottle-nose.

Teeth $\frac{2}{2}\frac{4}{3}.\frac{2}{2}\frac{4}{3} - \frac{2}{2}\frac{7}{8}.\frac{2}{2}\frac{7}{5}$. Upper surfaces and sides light lead-color, which gradually passes into dirty leaden white below, the latter marked, as also are the flippers, with longitudinally elongated blotches of dark lead-color.

Habitat.—Australia.

Dimensions.—Total length to eight feet at least.

References.—Gray, B.M. Catal. Seals and Whales, p. 262; Scott, Seals and Whales, p. 82.

Genus VII.—SOTALIA, *Gray* (1866).

Beak depressed, rather longer than the brain cavity. Palate without lateral grooves. Lower jaw rather broad behind. Symphysis short. Teeth slender, conical. Pectoral fin obliquely truncated. Pterygoid bones separated.

Vertebræ.—C. 7, D. 12, L. 10, Cd. 22 = 51.

1. SOTALIA GADAMU, *Owen, sp.* (1865).

Beak rather short, equal in length to the distance between its base and the eyes; its apex obtuse. Lower jaw a little longer than the upper. Blow-hole crescentic, situated on the middle of the vertex between the eyes. Dorsal and pectoral fins falcate, of nearly equal size. Body above dark plumbeous gray, almost black on the fins; below pinkish ashy-gray with a few small irregular blotches of light plumbeous gray.

Dentition.—$\frac{23-27}{24-28} = 96-108$.

Dimensions.—Total length about seven feet.

Habitat.—Indian and West Australian Seas.

Reference.—Owen, Tr. Z.S. vi. p. 17, pl. iii. figs. 1 and 2.

Order III.—CHIROPTERA.

Mammals with the fore limbs specially modified so as to adapt them for flight. The fore arm consists of a rudimentary ulna, a long curved radius, and a carpus of six bones, which supports a thumb and four greatly elongated fingers, between which, the sides of the body, and the hinder extremities the wing-membrane is spread out. A peculiar elongated cartilaginous process, the calcaneum, which is rarely rudimentary or absent, rises from the inner side of the ankle-joint, is directed inwards, and supports the interfemoral membrane. Mammæ thoracic.

Suborder I—Megachiroptera.

Crowns of molar teeth smooth with a longitudinal furrow. Bony palate narrowing slowly backwards, continued behind last molar. Second finger generally terminating in a claw. Sides of ear-conch forming a complete ring at the base. Pyloric extremity of the stomach elongated.

Habits.—Frugivorous; mellivorous; anthophagous.

Family I.—PTEROPODIDÆ.

Flying Foxes; Fruit-eating Bats.

Characters similar to those of the Suborder.

Genus I.—PTEROPUS, *Brisson* (1756).

Size large or medium. Muzzle long, narrow, and cylindrical. Nostrils projecting by their inner margins, the extremity of the muzzle deeply emarginate between them. Tongue of moderate length. Upper lip with a vertical groove in front, bounded laterally by rounded naked ridges. Ears variable in size. Index finger with a distinct claw. Metacarpal bone of middle finger

shorter than the index finger. Wing-membrane from the sides of the back and the back of the first phalanx of the second toe. Tail none. Fur of the nape of the neck and shoulders differing conspicuously from that of the back. Molars well developed.

Dentition.—I. $\frac{4}{4}$, C. $\frac{1-1}{1-1}$, P. $\frac{3-3}{3-3}$, M. $\frac{2-2}{3-3}$ = 34.

Note.—The Pteropine Bats form one of the greatest pests with which orchardists have to contend, the amount of injury done in a single night by a flock of these animals being almost incalculable, and, so far as I am aware, no feasible proposal has as yet been put forward either for their destruction or for the protection of the orchards from their ravages. They live in enormous communities, choosing for their resting places the most inaccessible parts of dense scrubs and gullies, from whence they sally forth in flocks towards sunset and return about the break of day, traversing frequently in the interval great distances in their search for food. As an instance of their powers of locomotion Dr. Ramsay (*Proc. Linn. Soc. N.S. Wales*, ii. p. 8, 1877) mentions, speaking of *Pteropus gouldi*, that they habitually cross at dusk from the mainland to the islands in Torres' Straits returning in the early morning to the scrubs. He also states that during the month of August many of the females had young of considerable size attached to the teats. Of *Pteropus conspicillatus* Mr. John Macgillivray says that, on apparently the only occasion on which he met with them, prodigious numbers were flying about in the bright sunshine. All these Bats have a most disagreeable musky odor, and the stench in and about the neighborhood of their rookeries, arising from the accumulation of their fœces and from the putrefying young, is said, in an old camp, to be almost unbearable. In these camps they may be seen by thousands on each tree, hanging head downwards, quarreling for the best places, keeping up all the while an incessant chattering or bickering *inter se;* and so great are their numbers that frequently large branches are broken off by the mere weight of the clinging Bats.

1. Pteropus poliocephalus, *Temminck* (1827).

Gray-headed Flying-Fox.

Size large. Ears much longer than the muzzle; the upper third of the conch narrow and subacutely pointed; the backs finely hairy. Interfemoral membrane very narrow in the middle and concealed by the fur. Fur everywhere long and dense, extending on both sides of the legs above to the ankles, below to the ends of the tibiæ; on the back directed backwards and slightly adpressed, quite three inches wide across the loins, and nearly two inches wide behind the elbow; on the legs and rump woolly; the membrane between the humerus and thigh hairy. Fur of the head gray with a yellowish tinge; neck, shoulders, and anterior

part of breast bright reddish-yellow; breast from shoulder to shoulder blackish-gray; back grayish-black, many of the hairs with shining extremities.

Dimensions.—Head and body about eight and a half inches; forearm about six and a fifth inches.

Habitat.—Australia.

References.—Dobson, B.M. Catal. Chiropt. p. 31; Gould, Mamm. Austr. iii. pl. xxviii.

2. Pteropus brunneus, *Dobson* (1878).

Dusky Flying-Fox.

Size large. Ears scarcely longer than the muzzle, triangular above, obtusely pointed, naked, Interfemoral membrane very narrow in the centre and concealed by the fur. Fur rather short throughout, longer on the neck than on the back, where it is directed backwards and slightly adpressed, nearly two inches wide across the middle of the back. A few fine erect hairs on the membrane between the humerus and thigh. Fur of the head, back, breast, and abdomen yellowish-brown, with a few shining hairs, the neck above brighter.

Dimensions.—Head and body about eight inches; forearm about four and a half inches.

Habitat.—Percy Island, North-east Australia.

Reference.—Dobson, B.M. Catal. Chiropt. p. 37, pl. iii. fig. 4* *(ear).*

3. Pteropus gouldi, *Peters* (1867).

Gould's Flying-Fox.

Ears long, narrow, and pointed. Interfemoral membrane very narrow behind and concealed in the middle by the fur. Thighs clothed with fur both above and below. Wing-membranes quite three inches apart at the middle of the back; beneath, as far as a line drawn from the elbow to the knee, clothed with long black fur. General color intensely black intermixed with a few grayish or yellowish hairs. Back of head and neck dark ferruginous-brown, the latter sometimes bright yellow in adult males.

Dimensions.—Head and body about nine inches; forearm about six and a half inches.

Habitat.—North-east Australia and the islands off the coast.

References.—Dobson, B.M. Catal. Chiropt. p. 60; Gould, Mamm. Austr. iii. pl. xxx.

Note.—See p. 78.

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* Erroneously "2" in letterpress.

4. Pteropus conspicillatus, *Gould* (1849).

Spectacled Flying-Fox.

Ears short, obtusely pointed, abruptly narrowed above. Interfemoral membrane very narrow behind, and concealed in the middle by the fur. Fur short, scarcely extending on to the forearms or legs, slightly more than two inches wide across the loins. Face and crown of head black with a ring of pale brownish-yellow fur round each eye; back of head, nape, and shoulders pale yellowish. Back and entire under surface black with a few shining yellowish hairs.

Dimensions.—Head and body from ten to twelve inches; forearm about seven inches.

Habitat.—North-east Australia and the islands off the coast; Yule Island, New Guinea.

References.—Dobson, B.M. Catal. Chiropt. p. 61; Gould, Mamm. Austr. iii. pl. xxix.

Note.—See p. 78.

5. Pteropus scapulatus, *Peters* (1862).

Collared Flying-Fox.

Size large. Ears longer than the muzzle, narrow and subacutely pointed, naked. Muzzle long and rather narrow. Interfemoral membrane narrow behind, but its posterior margin beneath not concealed by the fur. Fur about an inch wide at the origin of the wings, about two inches on the middle of the back; the wing membrane between the humerus and thigh covered with long woolly hair. General color of fur reddish- or yellowish-brown, with a much paler collar round the neck; adult males with a light buff-colored tuft of hairs on each shoulder; back, breast, and abdomen dark reddish-brown.

Dimensions.—Head and body about nine inches; forearm about five and a half inches.

Habitat.—North-east Australia.

Reference.—Dobson, B.M. Catal. Chiropt. p. 41.

Note.—In the length of the muzzle, and the very narrow unicuspidate teeth, this species differs so much from all its congeners, and so closely resembles the long-tongued *Macroglossi*, as to make it probable that its food is similar to that of those forms.

Genus II.—URONYCTERIS, *Gray* (1862).

Size medium. Muzzle short, obtuse, and very thick. Nostrils tubular, projecting abruptly for a considerable distance from the upper extremity of the muzzle. Tongue of moderate length.

Upper lip very deep, divided by a narrow groove, which is continuous with the emargination between the bases of the nasal tubes. Ears oval, well developed. Index finger with a large claw. Wing membrane from the sides of the back and from the base of the second toe. Tail short, half concealed in the interfemoral membrane. Molars well developed.

Dentition.—I. $\frac{2}{0}$, C. $\frac{1-1}{1-1}$, P. $\frac{2-2}{3-3}$, M. $\frac{2-2}{2-2} = 24$.

Note.—The generic name *Harpyia* bestowed on these Bats by Illiger in 1811 cannot be used, since it had been bestowed in the preceding year upon a genus of Lepidopterous Insects by Ochsenheimer.

1. Uronycteris cephalotes, *Pallas, sp.* (1767).

Pallas' Fruit Bat.

Nostrils in the form of cylindrical tubes, projecting abruptly from the extremity of the muzzle high above the margin of the upper lip, with slightly dilated, notched apertures. Eyes large, placed high up on the sides of the head. Ears longer than the muzzle, their summit rounded. Fur above reddish-brown with an ashy tinge, below dull yellowish-white: a narrow, almost black, streak from between the shoulders to the base of the interfemoral membrane.

Dimensions.—Head and body about four and a half inches; tail about nine-tenths of an inch; forearm about three inches.

Habitat.—York Peninsula, North Australia.

Reference.—Dobson, B.M. Catal. Chiropt. p. 88.

Genus III.—MACROGLOSSUS, *F. Cuvier* (1825).

Size small. Muzzle very long, narrow, and cylindrical. Nostrils not projecting. Upper lip not grooved in front. Tongue very long, attenuated. Ears simple, separated at their inner bases. Index finger with a distinct claw. Metacarpal bone of middle finger equal to or longer than index finger. Wing-membrane from the sides and base of the fourth toe. Tail very short.

Dentition.—I. $\frac{4}{4}$, C. $\frac{1-1}{1-1}$, P. $\frac{2-2}{3-3}$, M. $\frac{3-3}{3-3} = 34$.

1. Macroglossus australis, *Peters* (1867).

Little Fruit Bat.

Ears scarcely more than half the length of the head, narrow and rounded at the tip. Face abruptly narrowed in front of the eyes. Upper lip deeply and distinctly grooved. Lower jaw slightly projecting beyond the upper. Tongue covered with

numerous long brush-like papillæ. Interfemoral membrane very narrow. Tail generally quite concealed by the fur. Fur reddish-brown, unusually long for this family.

Dimensions.—Head and body about two and a third inches; tail about a third of an inch; forearm about one and two-fifths inch.

Habitat.—North and West Australia. From the Philippine Islands through the Malay Archipelago eastward to New Ireland and the Solomon Islands.

Reference.—Thomas, Proc. Zool. Soc. 1888, p. 476.

Note.—Though of so small a size, this Bat is said to be very destructive to fruit.

Suborder II.—Microchiroptera.

Crowns of molar teeth acutely tubercular with transverse furrows. Bony palate narrowing abruptly, not continued behind last molar. Second finger not terminating in a claw. Sides of ear-conch separated at the base anteriorly. Stomach simple, or with the cardiac extremity more or less elongated.

Habits.—Carnivorous; principally insectivorous; rarely frugivorous or sanguinivorous.

Family II.—RHINOLOPHIDÆ.

Leaf-nosed Bats.

Nasal apertures situated in a depression upon the upper surface of the muzzle, and surrounded with well developed foliaceous cutaneous appendages. Ears large, generally separated, without tragi. Index finger imperfect, without a phalanx. Tail distinct produced to the outer margin of the interfemoral membrane. Premaxillary bones rudimentary, suspended from the nasal cartilage. Upper incisors rudimentary, close together.

Subfamily I.—Rhinolophinæ.

First toe with two joints; others with three each. Iliopectineal spine not connected by bone with the antero-inferior surface of the ilium.

Genus I.—RHINOLOPHUS, *Geoffroy* (1803).

Nose-leaf very complicated, consisting of three distinct portions; the anterior horizontal, horseshoe-shaped, usually angularly emarginate in front, containing within its circumference the nasal orifices, and the central erect nasal processes; the posterior erect, triangular, with cells on its anterior surface; the central

process rises between and behind the nasal orifices, is flattened anteriorly, and posteriorly sends backwards a vertical laterally compressed process, which is either connected with the front surface of the posterior nose-leaf or free. Base of the outer side of the ear expanded, forming a large antitragus.

Dentition—I. $\frac{3}{4}$, C. $\frac{1-1}{1-1}$, P. $\frac{2-2}{3-3}$, M. $\frac{3-3}{3-3} = 32$.

Habits.—Insectivorous.

1. Rhinolophus megaphyllus, *Gray* (1834).

Greater Horseshoe Bat.

Ears subacutely pointed; the tip not attenuated; antitragus large. Horseshoe-shaped membrane broad, concealing the muzzle, and with a small but distinct notch in front. Sides of the terminal process of the posterior leaf concave. Lower lip with three grooves. Wings from the metatarsus. Interfemoral membrane square behind or slightly convex. Tail scarcely projecting.

Dimensions.—Head and body about two inches; tail about one inch; forearm about, but not quite two inches.

Habitat.—Queensland; Richmond and Clarence Rivers District.

References.—Dobson, B.M. Catal. Chiropt. p. 110; Gould, Mamm. Austr. iii. pl. xxxiii.

Subfamily II.—Hipposiderinæ.

Toes equal, of two phalanges each. Iliopectineal spine united by a bony isthmus to a process derived from the antero-inferior surface of the ilium.

Note.—Owing to the compulsory rejection of the generic title *Phyllorrhina* it has become necessary to substitute for it the above term.

Genus II.—RHINONYCTERIS, *Gray* (1847).

Nose-leaf horseshoe-shaped in front, the horizontal membrane consisting of two laminæ, the upper one deeply emarginate in front, the sides of the emargination bent upwards, supporting the anterior portion of a small flat horizontal longitudinal process, which ends behind and between the deeply sunken nasal orifices; from the centre of the base of the horseshoe, behind the nostrils, a pointed process projects forwards, behind which is the opening of a deep central cell, bounded on each side by a longitudinal cell, beyond which and above the eye are two smaller cells; behind the central cell is a longitudinal depression. Ears separate without antitragus.

Dentition.—I. $\frac{2}{4}$, C. $\frac{1-1}{1-1}$, P. $\frac{2-2}{2-2}$, M. $\frac{3-3}{3-3}$ = 30.

Habits.—Insectivorous.

1. Rhinonycteris aurantia, *Gray*, *sp.* (1845).

Orange Horseshoe Bat.

Head long; muzzle thick, obtuse, and flattened laterally. Ears shorter than the head, with acutely pointed tips; the inner margin of the conch regularly convex. Nose-leaf broad, overhanging the muzzle, the sides of the horseshoe with a slight notch succeeded by a small rounded projection in the centre of each side, and from the centre of the base a small pointed process projects forwards and upwards. Wings from the distal extremity of the tibia or from the ankles. Calcanea feeble. Extreme tip of tail projecting. Fur everywhere golden.

Dimensions.—Head and body about one and six-sevenths inch; tail rather more than an inch.

Habitat.—North and North-west Australia.

References.—Dobson, B.M. Catal. Chiropt. p. 126, pl. viii. fig. 2 *(front view of head)*; Gould, Mamm. Austr. iii. pl. xxxv.

Genus III.—HIPPOSIDERUS, *Gray* (1831).

Anterior nose-leaf like that of Rhinolophus, but not emarginate in front; the posterior erect, with a convex, lobed, or incised free edge, concave in front, the concavity simple, or divided by narrow vertical ridges into shallow cells; the middle portion forming the posterior boundary of the depression at the bottom of which the nasal orifices are placed, is usually broadly cordiform with the base upwards, the sides thickened, the centre with or without a projecting point or narrow longitudinal ridge in front. No antitragus.

Dentition.—I. $\frac{2}{4}$, C. $\frac{1-1}{1-1}$, P. $\frac{2-2}{2-2}$, M. $\frac{3-3}{3-3}$ = 30.

Habits.—Insectivorous.

Note.—The generic title *Phyllorrhina* used by Bonaparte in 1831 for these Bats is inadmissable, no description having been given (see Blanford, Proc. Zool. Soc. 1887, p. 635).

1. Hipposiderus cervinus, *Gould*, *sp.* (1853).

Fawn-colored Horseshoe Bat.

Ears much shorter than the head; lower third of the outer margin of conch with a small, acutely pointed projection. Horseshoe much narrowed in front of the nasal apertures with two external secondary leaflets. Frontal glandular sac large. Thumbs

and feet small. Wing-membrane extending to the tarsus. Interfemoral membrane of moderate size, triangular. Extreme tip of tail free. Fur reddish-brown, darkest above.

Dimensions.—Head and body about two inches; tail about one inch; forearm about one and three-fourths inch.

Habitat.—York Peninsula; Aru Islands; Waigiou; New Guinea; Duke of York Islands.

References.—Dobson, B.M. Catal. Chiropt. p. 142, pl. ix. fig. 7 *(front view of head)*; Gould, Mamm. Austr. iii. pl. xxxiv.

2. Hipposiderus bicolor, *Temminck*, *sp.* (1835–1841).

var. a. *H. aruensis*, Gray (1858).

Brown Horseshoe Bat.

Ears moderate, about equal in length to the head, oval; the upper third of the outer margin straight. Horseshoe small and square, scarcely as wide as the transverse terminal leaf, the concave front surface of which is divided into four cells by three distinct vertical ridges; no secondary leaflets; frontal glandular sac well developed in males, rudimentary in females. Wing-membrane extending to the ankle or tarsus. Interfemoral membrane slightly angular behind. Extreme tip of tail free. Fur above very dark brown, almost black; below grayish-brown.

Dimensions.—Head and body about one and three fourths inch; tail rather less than an inch; forearm about one and a half inch.

Habitat.—Albany Island, Cape York; Aru Islands.

Reference.—Dobson, B.M. Catal. Chiropt. p. 150.

Family III.—NYCTERIDÆ.

Nasal apertures situated upon the upper surface of the muzzle, and margined by distinct cutaneous appendages. Ears large, united, with well developed tragi. Index finger with or without a short phalanx. Premaxillary bones cartilaginous or small. Upper incisors absent or very small; when present close together.

Subfamily I.—Megaderminæ.

Nostrils at the bottom of a concavity near the extremity of the muzzle, concealed by the base of a large cutaneous process; tail very short, in the base of the large interfemoral membrane; premaxillaries cartilaginous.

Genus I.—MEGADERMA, *Geoffroy* (1810).

Muzzle cylindrical, elongated. Nostrils in a slight depression near the extremity of the muzzle, surrounded by a naked cutane-

ous expansion, which forms a vertical process posteriorly. Lower lip projecting slightly beyond the upper. Ears large, partially connected; tragus long, bifid. Index finger with a short bony phalanx. Toes subequal; the outer with two, the others with three phalanges. Calcaneum distinct. Tail very short, only discernible in skeletons. Interfemoral membrane large, concave behind.

Dentition.—I. $\frac{0}{4}$, C. $\frac{1-1}{1-1}$, P. $\frac{2-2}{2-2}$ (Australian and Oriental Regions) or $\frac{1-1}{2-2}$ (Ethiopian Region), M. $\frac{3-3}{3-3} = 28$ or 26.

Habits.—Carnivorous and insectivorous. Some, probably all, of the members of this genus are sanguinivorous and carnivorous, feeding not only on insects but also on smaller kinds of Bats and other small Mammals, and even Frogs and Fishes, while it may be presumed that small Birds and Reptiles would prove equally acceptable. This habit has been specially noticed by several observers in the Indian *M. lyra*.

1. MEGADERMA GIGAS, *Dobson* (1880).

Great Blood-sucking Bat.

Lower jaw projecting beyond the upper. Ears considerably longer than the head, conjoined for nearly half the length of the inner margin, oval and rounded off above. Tragus large, bifid, the posterior lobe long, narrow, and acutely pointed, the anterior lobe scarcely half the length of the posterior, broad at the base, convex in front, and obtusely rounded above. Nose-leaf with convex sides, the anterior concave disc large, the external margin thickened and adherent to the muzzle beneath; base of the longitudinal process cordate. Extremity of the second finger extending beyond the middle of the first phalanx of the third finger. Wing-membrane from the back of the foot. Tail rudimentary. Interfemoral membrane large. A well marked postorbital process not perforated by a foramen. Terminal third of the fur above pale grayish-brown, beneath almost white, as also are the ears, nose-leaf, and membranes.

Dimensions.—Head and body about five and a third inches; forearm about four and a fifth inches.

Habitat.—Wilson's River, Central Queensland.

Reference.—Dobson, Proc. Zool. Soc. 1880, p. 461, pl. xlvi. figs. *a (animal)*, *b (upper view of skull)*.

Family IV.—VESPERTILIONIDÆ.

Nasal apertures simple, crescentic or circular, situated at the extremity of the muzzle, without cutaneous appendages. Ears large or medium, generally separate, with rather large tragi. Tail

long, produced to the hinder margin of the large interfemoral membrane. Upper incisors distant from one another.

Genus I.—NYCTOPHILUS, *Leach* (1822).

Muzzle narrow, thinly covered with short hairs; glandular prominences well developed. Crown of the head slightly elevated above the face line. Nostrils with their upper margins continuous with the base of a small cordate nose-leaf. Ears large, oval, and connected; tragus short and triangular. Eyes large. Wings from the bases of the toes. Tail slightly projecting beyond the interfemoral membrane. Upper incisors unicuspidate, close to the canines.

Dentition.—I. $\frac{2}{6}$, C. $\frac{1-1}{1-1}$, P. $\frac{1-1}{2-2}$, M. $\frac{3-3}{3-3} = 30$.

Habits.—Insectivorous.

Note.—This genus takes the place in the Australian Region of the Palæ- and Ne-arctic *Plecotus*.

1. Nyctophilus timoriensis, *Geoffroy, sp.* (1806).

Australian Long-eared Bat.

Ears longer than the head, connected on the forehead by a well developed band; the tip rounded; upper third of outer margin of conch straight. Tragus short, triangular, and subacute. Glandular elevation behind the short nose-leaf longitudinally grooved in the middle. Broad extremity of nose-leaf upwards and free. Extreme tip of tail free. Fur above varying from dark to light brown; below from pale brown to white.

Dimensions.—Head and body about two inches; tail and forearm about one and four-fifths inch each.

Habitat.—All Australia, Tasmania, and the neighboring Islands; from Timor to the Fiji Islands.

References.—Dobson, B.M. Catal. Chiropt. p. 172, pl. xi. fig. 7 *(front view of head)*; Gould, Mamm. Austr. iii. pls. xxxvi., *(N. geoffroyi)*; xxxvii. *(N. gouldi)*; xxxviii. (*N. unicolor*); xxxix. (*N. timoriensis*).

Note.—Owing to the great variation in size, coloration, and the development of the glandular prominences Tomes divided *N. timoriensis* into four distinct forms under the specific names *geoffroyi*, *timoriensis*, *gouldi*, and *unicolor;* these however can at the most be only regarded as races of Geoffroy's original species.

2. Nyctophilus walkeri, *Thomas* (1892).

Walker's Bat.

Ears when laid forwards not quite reaching to the nose-leaf, connected by a band across the forehead; the small lobe on the

inner surface of the base of the outer margin short and well defined. Fur shorter and paler in color than in the preceding species, especially on the under surface, where the hairs are tipped with dirty white.

Dimensions.—Head and body of type specimen (♀) rather less than two inches; tail one and a half inch; forearm one and one-third inch.

Habitat.—Northern Territory (Adelaide River).

Reference.—Thomas, Ann. Nat. Hist. (6) ix. p. 405.

Note.—The almost entire absence of a transfrontal band, along with the larger size, longer and broader ears with a more convex inner margin, separate the *N. microtis*, Thms. (Ann. Nat. Hist. (6) ii. p. 226) of South-eastern New Guinea from this species.

Genus II.—VESPERUGO, *Keyserling & Blasius* (1839).

Form comparatively stout. Muzzle very broad and obtuse; glandular prominences well developed. Crown of head flat or very little elevated above the face line. Nostrils sublateral, simple, crescentic. Ears short, broad, and triangular, obtusely pointed, separate; tragus generally short and obtuse. Calcaneum with a small postcalcaneal lobe on its posterior margin. Feet short and broad. Upper incisors in pairs separated by a wide interval.

Dentition.—I. $\frac{4}{6}$, C. $\frac{1-1}{1-1}$, P. $\frac{2-2}{2-2}$ or $\frac{1-1}{2-2}$, M. $\frac{3-3}{3-3}$ = 34 or 32.

Habits.—Insectivorous.

1. Vesperugo pumilus, *Gray, sp.* (1841).

Little Bat.

Muzzle not very obtuse. A shallow furrow between the muzzle and the glandular prominences. Ear-conches short and funnel-shaped; middle third of outer margin and lower two-thirds of inner margin very convex; the tips short and rather abruptly rounded off. Tragus well developed and rather broad. Wings extending to the bases of the toes. Postcalcaneal lobe long and convex behind. Tip of tail free. Fur above and below black, the extreme tips above ashy or grayish, the terminal fifth below white or pale ash-color.

Dimensions.—Head and body about one and a half inch; tail about one and a third inch; forearm about one and a fourth inch.

Habitat.—All Australia and Tasmania.

References.—Dobson, B.M. Catal. Chiropt. p. 201, pl. xii. fig. 2 *(ear)*; Gould, Mamm. Austr. iii. pl. xlvi.

2. Vesperugo abramus, *Temminck, sp.* (1835 - 1841).

Yellow-headed Bat.

Muzzle obtuse. Glandular prominences on the sides large and rounded, causing a furrow between them and the crown of the head. Ear-conches broadly triangular, rounded at the tips; the outer margin almost straight. Tragus moderate. Wing-membrane attached to the bases of the toes. Postcalcaneal lobe distinct and rounded. Tip of tail free. Head and face between the eyes densely covered with moderately long fur; space in front of the ears, about the eyes, and extremity of muzzle generally almost naked. Fur above dark brown, tipped with light yellowish-brown; head and neck wholly yellowish-brown; below sooty-brown, the tips lighter than those of the upper surface.

Dimensions.—Head and body about one and four-fifths inch; tail about one and a half inch; forearm about one and a third inch.

Habitat.—North Australia; the Oriental Region from Ceylon to Southern Japan, and the Malay Archipelago; and in summer entending westwards to Middle Europe.

Reference.—Dobson, B.M. Catal. Chiropt. p. 226.

3. Vesperugo kreffti, *Peters* (1869).

Krefft's Bat.

Ear-conches shorter than the head, triangular, the tips rounded and, owing to a deep and abrupt emargination on the upper third of the outer margin, distinct, Tragus acutely pointed and curved inwards, with a distinct, acutely triangular lobe at the bases of the outer margin. Wing-membrane attached to the bases of the toes or to the metatarsus. Postcalcaneal lobe very shallow. Cartilaginous extremity of tail only free. Face in front of the ears nearly naked, the glandular prominences with a few long hairs. Fur above dark reddish-brown; below paler.

Dimensions.—Head and body about two and two-fifths inches; tail about two inches; forearm rather shorter than the tail.

Habitat.—New South Wales; Tasmania.

References.—Dobson, B.M. Catal. Chiropt. p. 232; Gould, Mamm. Austr. iii. pl. xlviii.

Genus III.—CHALINOLOBUS, *Peters* (1866).

Muzzle broad, generally very short and obtuse: glandular prominences well developed. Crown of head slightly raised above face-line. Nostrils sublateral, forming a prominent flattened central ridge on the upper surface of the muzzle, separated from the glandular prominences by a distinct groove. Ears short, broad, rhomboidal or ovoid; the tragus expanded above and

curved inwards. Lower lip with a distinct fleshy lobule on either side near the angle of the mouth, projecting horizontally outwards. Wings from the bases of the toes. Upper incisors unequal and unicuspid ; the outer ones short, the inner long.

Dentition.—I. $\frac{4}{6}$, C. $\frac{1-1}{1-1}$, P. $\frac{2-2}{2-2}$ (Australian) or $\frac{1-1}{1-1}$ (African), M. $\frac{3-3}{3-3} = 34$ or 32.

Habits.—Insectivorous,

1. Chalinolobus morio, *Gray, sp.* (1841).

Chocolate or Small-toothed Bat.

Ears small, rounded off above. Tragus narrow at the base, expanded in the middle. Nostrils opening slightly downwards, the margins of the apertures sharply cut and projecting above, separated by a rather wide concave space having a small median ridge. Postcalcaneal lobe well developed, supported internally by a cartilaginous prop, the curved extremity of which forms its posterior margin. Tail wholly contained within the interfemoral membrane. Fur above dark brown, almost black, on the head and anterior half of the body, passing into dark chestnut-brown posteriorly ; below similar but slightly paler. Body fur rather long and thick. Base of interfemoral membrane between the thighs only furry.

Dimensions.—Head and body about one and four-fifths inch; tail about one and seven-tenths inch ; forearm about one and a half inch.

Habitat.—From southern Queensland through New South Wales and Victoria to South Australia; Tasmania; New Zealand.

References.—Dobson, B.M. Catal. Chiropt. p. 248, pl. xiv. figs. 1 (*ear*), 1a *(muzzle)*; Gould, Mamm. Austr. iii. pl. xli. (*S. morio*), xlii. *(S. microdon)*; Thomas, Ann. Nat. Hist. (6) iv. p. 462.

2. Chalinolobus signifer, *Dobson* (1876).

Dobson's Bat.

Ears and nostrils as in *C. tuberculatus.* An erect transverse process on the face between and slightly in front of the eyes ; its free upper margin regularly convex. All other characters similar to those of the preceding species.

Dimensions.—Head and body about two inches ; tail about one and three-fourths inch; forearm about one and two-fifths inch.

Habitat.—South Central Queensland.

Reference.—Dobson, B. M. Catal. Chiropt. p. 250, pl. xiv. figs. 2 *(front view of head)*, 2a *(muzzle)*.

Note.—Probably not distinct from the preceding species.

3. Chalinolobus gouldi, *Gray, sp.* (1841).

Gould's Bat.

Ears rather angular on the upper half, the tips rounded. Tragus broad above, the tip subtruncate. Nostrils prominent above, separated on each side by a small sulcus from the well developed glandular prominences. Lower lip with a distinct fleshy lobe. Postcalcaneal lobe well developed and rounded. Extreme tip of the tail projecting. Fur above on the head, neck, and shoulders black with a very faint reddish tinge; the back yellowish-brown; below, the breast reddish or ashy, the abdomen, sides, wing- and interfemoral membranes pale yellowish-white.

Dimensions.—Head and body about two and a half inches; tail about two and a quarter inches; forearm about one and four-fifths inch.

Habitat.—Eastern and South-eastern Australia, and Tasmania.

References.—Dobson, B.M. Catal. Chiropt. p. 250, pl. xiv. figs. 4 *(side view of head)*, 4a *(interfemoral membrane)*, 4b *(upper incisors)*; Gould, Mamm. Austr. iii. pl. xl.

4. Chalinolobus nigrogriseus, *Gould, sp.* (1863).

Pied or Blackish-gray Bat.

Ears very rhomboidal; the tip rounded. Tragus expanded outwards above. Nostrils prominent on the upper surface of the muzzle, projecting slightly by their inner margins in front, and closer together than those of any other species of the genus. Postcalcaneal lobe well developed and rounded. Last rudimentary joint of the tail free. Fur above deep black with gray or pale brown tips to the hairs; below similar but with ashy tips.

Dimensions.—Head and body about one and three-fourths inch; tail and forearm each one and one-third inch.

Habitat.—Northern and Eastern Australia.

References.—Dobson, B.M. Catal. Chiropt. p. 251, pl. xiv. figs. 3 (*ear*), 3a (*muzzle*); Gould, Mamm. Austr. iii. pls. xliii. (*Scotophilus picatus*), xliv. *(S. nigrogriseus)*.

Genus IV.—SCOTOPHILUS, *Leach* (1822).

Form stout. Muzzle short, obtusely conical, naked; glandular prominences variable. Crown of the head but little elevated above the face line. Nostrils close together, simple, lunate, opening to the front or sublaterally, their inner margins projecting. Ears short, longer than broad, with rounded tips. Tragus tapering, subacutely pointed, and curved inwards. Terminal rudimentary vertebra of tail protruding beyond the interfemoral membrane. Calcaneum weak. Wings attached to, or close to

bases of toes. Upper incisors long, unicuspidate, acute, basally close to the canines.

Dentition.—I. $\frac{2}{6}$, C. $\frac{1-1}{1-1}$, P. $\frac{1-1}{2-2}$, M. $\frac{3-3}{3-3}$ = 30.

Habits.—Insectivorous.

1. SCOTOPHILUS RUEPPELLI, *Peters, sp.* (1866).

Rüppell's Bat.

Ears short, the tips obtusely rounded. Tragus rather narrow, subacutely pointed, the basal half of the outer margin with two distinct emarginations, the upper half slightly convex and sloping inwards; no transverse ridge on its outer surface. Fur short, on the upper surface almost wholly confined to the body; dark brown above and below, the extreme tips above and the terminal fourth below ashy; sometimes with a chesnut tinge throughout.

Dimensions.—Head and body about two and three-fourths inches; tail not quite two inches; forearm two inches.

Habitat.—New South Wales.

Reference.—Dobson, B.M. Catal. Chiropt. p. 263, pl. xv. fig. 2 *(side view of head).*

2. SCOTOPHILUS GREYI, *(Gray) Dobson* (1875).

Grey's Bat.

Ears short, triangular, the tips rounded. Tragus broad, obtuse, the basal half of the outer margin straight, the terminal half convex and sloping inwards; no transverse ridge on its outer surface. Postcalcaneal lobe small, but distinct, rounded. Fur short, the face in front of the eyes nearly naked; chestnut-brown above and below, the extreme tips of the latter ashy.

Dimensions.—Head and body about one and three-fourths inch; tail and forearm about one and one-fifth inch.

Habitat.—Port Essington; Liverpool Ranges,

References.—Dobson, B.M. Catal. Chiropt. p. 263, pl. xv. fig. 4 *(ear)*; Gould, Mamm. Austr. iii. pl. xlv.

Genus V.—VESPERTILIO, *Keyserling & Blasius* (1839).

Muzzle long, thickly hairy; glandular prominences small. Crown of head vaulted, slightly elevated above face-line. Nostrils sublateral, simple, crescentic. Ears oval, longer than broad, separate; tragus long, generally acute and attenuated upwards. Postcalcaneal lobe absent or very small. Upper incisors nearly equal, in pairs close to the canines.

Dentition.—I. $\frac{4}{6}$, C. $\frac{1-1}{1-1}$, P. $\frac{3-3}{3-3}$, M. $\frac{3-3}{3-3}$ = 38.

Habits.—Insectivorous.

1. Vespertilio adversus, *Horsfield* (1824).

Great-footed Bat.

Extremity of ear broadly triangular, with the angle rounded off; upper half of outer margin straight. Tragus well developed, the extremity straight. Wings from the ankles and the sides of the body. Interfemoral membrane forming a very acute angle behind. Feet very large. Tail projecting beyond the membrane to some extent. Calcaneum very long, extending at least three-fourths of the distance between the ankle and the tail. Fur of moderate length. Second upper premolar extremely small, placed quite inside, in the angle between the first and third premolars, not visible from without.

Dimensions.—Head and body about two inches; tail about one and three-quarters inch; forearm about one and a half inch; foot about half an inch.

Habitat.—From Siam through Java, Borneo and the Celebes to the northern half of Australia.

References.—Dobson, B.M. Catal. Chiropt. p. 292, pl. xviii. fig. 4 *(ear enlarged)*; Gould, Mamm. Austr. iii. pl. xlvii.

2. Vespertilio australis, *Dobson* (1878).

Small-footed Bat.

Extremity of ear broad and very obtusely rounded; upper third of outer margin deeply concave. Tragus well developed, the narrow extremity rounded and slightly curved outwards. Wings from the bases of the toes. Interfemoral membrane forming an obtuse angle behind. Feet of moderate size. Only the extreme tip of the tail projecting. Calcaneum extending about half-way between the ankle and the tail. Fur short. Second upper premolar small, but in the normal position and so visible from without. Brown, the extreme tips above and the terminal third below lighter.

Dimensions.—Head and body about one and four-fifths inch; tail and forearm about one and one half inch; foot about one-third of an inch.

Habitat.—New South Wales.

Reference.—Dobson, B.M. Catal. Chiropt. p. 317.

Genus VI.—KERIVOULA, *Gray*, (1842).

Muzzle narrow and elongated; glandular prominences very small and indistinct. Crown of the head considerably vaulted. Nostrils simple, circular, sublateral. Ears funnel-shaped, diaphanous, studded with glandular papillæ; tragus long, narrow, and acutely pointed. Wings from the bases of the toes. Calcaneum

long and strong, curved backwards, without postcalcaneal lobe. Outer incisor shorter than the inner one, sometimes minute.

Dentition.—I. $\frac{4}{6}$, C. $\frac{1-1}{1-1}$, P. $\frac{3-3}{3-3}$, M. $\frac{3-3}{3-3} = 38$.

Habits.—Insectivorous; forest-haunting.

1. Kerivoula papuensis, *Dobson* (1878).

Eastern Forest Bat.

Ears extending nearly to the end of the muzzle when laid forwards, the tips rounded, the outer margin with a deep concavity occupying its upper fourth. Tragus with a distinct rounded lobe at the base of its outer margin, succeeded by a deep notch. Fur above dark brown, with the terminal fourth shining yellow; below paler brown, with the extreme tips shining gray; forearm clothed with short adpressed golden hairs.

Dimensions.—Head and body about one and four-fifths inch; tail about the same length; forearm about one and a half inch.

Habitat.—North-eastern Australia; South-eastern New Guinea.

Reference.—Dobson, B.M. Catal. Chiropt. p. 339.

Genus VII.—MINIOPTERUS, *Bonaparte* (1837).

Muzzle rather short and broad; glandular prominences well developed. Crown of the head abruptly and considerably elevated above the face-line. Nostrils simple, lunate, sublateral. Ears rhomboidal, separate; tragus short and obtuse. First phalanx of middle finger very short. Wings to the ankles or the tibiæ, attached to the inferior surface. Feet long and slender; toes subequal. Upper incisors short, weak, separated from the canines.

Dentition.—I. $\frac{4}{6}$, C. $\frac{1-1}{1-1}$, P. $\frac{2-2}{3-3}$, M. $\frac{3-3}{3-3} = 36$.

Habits.—Insectivorous.

1. Miniopterus schreibersi, *Natterer* (1819).

Schreibers' Bat.

A deep horizontal groove beneath the eye. Ears much shorter than the head, very much rounded above, the outer margin straight above. Tragus rather more than twice as long as broad, rounded above. Wings to the ankles or to the extremity of the tibiæ. Feet long and slender. Tail wholly contained within the interfemoral membrane, which is nearly naked above. Fur above and below grayish, sometimes reddish, the basal half of the hairs dark grayish-brown.

Dimensions.—Head and body about two and one-fifth inches; tail about the same; forearm about one and three-fourths inch.

Habitat.—Australia and the Islands of Torres Straits; from New Guinea and the Malay Archipelago westward through the whole of southern Asia and Europe; Africa from the Mediterranean to the Cape of Good Hope.

Reference.—Dobson, B.M. Catal. Chiropt. p. 348.

2. Miniopterus australis, *Tomes* (1858).

Differs chiefly from *M. schreibersi* in its smaller size and the distribution of the fur. Interfemoral membrane clothed as far back as a line drawn from one ankle to the other; tibiæ covered with fine hairs. Fur dark reddish-brown throughout above; below darker brown basally, the extremities grayish.

Dimensions.—Head and body about one and three-fourths inch; tail about the same; forearm about one and three-fifths inch.

Habitat.—Australia; Loyalty Islands.

Reference.—Dobson, B.M. Catal. Chiropt. p. 351.

Family V.—EMBALLONURIDÆ.

Nasal apertures simple or valvular, situated at the extremity of the muzzle, without distinct cutaneous appendages. Ears large, often united, with short tragi. Tail partially free, either perforating the interfemoral membrane and appearing upon its upper surface, or produced far beyond its posterior margin. Upper incisors separated in front.

Subfamily I.—Emballonurinæ.

Tail slender, perforating the interfemoral membrane and appearing upon its upper surface, or terminating in it. Legs long; fibulæ very slender. Upper incisors weak.

Genus I.—TAPHOZOUS, *Geoffroy* (1812).

Muzzle very conical, broad behind, very narrow in front, terminated by the slightly projecting inner margin of the valvular nostrils. Ears separate; tragus short, narrow in the middle, expanded above. Lower lip as long or slightly longer than the upper. Generally a glandular sac, opening anteriorly, between the angles of the lower jaw, more or only developed in the males. Tail perforating the interfemoral membrane, and appearing on its upper surface, capable of being partially withdrawn. Upper incisors often absent in adults.

Dentition.—I. $\frac{2}{4}$, C. $\frac{1-1}{1-1}$, P. $\frac{2-2}{2-2}$, M. $\frac{3-3}{3-3}$ = 30.

Habits.—Insectivorous.

1. Taphozous australis, *Gould* (1853).

Sharp-nosed Bat.

Lower lip scarcely grooved. Gular sac distinct but rather small in the males, absent in the females. Ears large, as long as or longer than the head. Radio-metacarpal pouch well developed. Wings from the ankles or tarsus. Tail slender. Interfemoral membrane clothed with fur as far as the point perforated by it. Fur rather long and dense, basally pure white above and below, the remaining three-fourths above dark brown, below paler.

Dimensions.—Head and body about three inches; tail about one and a third inch; forearm about two and three-fourths inches.

Habitat.—Australia and New Guinea.

References.—Dobson, B. M. Catal. Chiropt. p. 382; Gould, Mamm. Austr. iii. pl. xxxii.

2. Taphozous flaviventris, *(Gould) Peters* (1866).

Yellow-bellied Bat.

Differs only from *T. australis*, in its color and superior size. Fur above uniform dark brown, below pale ochraceous yellow, whitish basally.

Habitat.—New South Wales.

Reference.—Dobson, B.M. Catal. Chiropt. p. 382.

Note.—Dr. Ramsay's *T. hargravii*, of which the type is in the Australian Museum, Sydney, is founded on a dried skin in very bad condition, and is possibly identical with this species; in any case until good specimens in the flesh are obtained and an extended examination and comparison thus rendered possible, it is premature to give it a place in our fauna. The specimen was obtained in the Wollongong District, N. S. Wales. It is but right to state that Dr. Ramsay still considers the species to be good; for the reason given above I can venture on no opinion.

3. Taphozous affinis, *Dobson* (1875).

Var. a. *T. insignis*, Leche (1884).

Leche's Bat.

Lower lip deeply grooved. Gular sac large in the males, rudimentary in the the females; behind its aperture a small duplication of the integument provided with thickened edges. Ears shorter than the head. Upper margin of tragus jagged. Radio-metacarpal pouch absent. Wings from the ankles. Interfemoral membrane naked. Fur above black with white bases, below pure silky white. Antebrachial and interfemoral membranes and the portion of the wing-membrane between the forearm and

the third finger white, between the first and third fingers black mottled with white along the latter.

Dimensions.—Head and body about three inches; tail about one inch; forearm nearly three inches.

Habitat.—South Australia.

Reference.—Leche, Proc. Zool. Soc. 1884, p. 51, fig. 4 A. *(side view of head showing lobature of left tragus)*; B. *(right tragus)*; C. *(under view of head showing subsidiary sac)*.

Note.—In enumerating the points of difference between the typical *T. affinis* of Dobson and his variety *insignis*, Prof. W. Leche lays stress on the color of the wing-membrane between the forearm and the third finger, but his description is word for word that of Dr. Dobson, so that, unless some clerical error has been committed, this difference (?) must be excised. In regard to the tragus it is noticeable that the form of the lobature in the, presumably typical, example figured is totally different on either side, as indeed is noticed by its describer, leading us to surmise that this may be the result of accident, or else an individual peculiarity; if this should prove to be the case there is nothing by which to separate this form from the typical species, except a rudimentary subsidiary gular sac in the male, hardly a sufficient difference on which to form even a variety. Prof. Leche can in any case be congratulated on having added a very distinct species of *Taphozous* to the Australian Fauna.

Subfamily II.—Molossinæ.

Tail thick, produced far beyond the posterior margin of the interfemoral membrane, which is movable upon it. Legs short and strong with well developed fibulæ. Feet large; the first toe and often the fifth, much larger than the others. Upper incisors strong.

Genus II.—NYCTONOMUS, *Geoffroy* (1812).

Extremity of muzzle broad, very obliquely truncated, projecting considerably beyond the lower lip, and terminated by the sharply cut margin of the nostrils. Ears united on the muzzle, or close together by the bases of their inner margins; tragus short, never linear. Upper lip expansible, generally deeply grooved by vertical wrinkles. First and fifth toes much thicker than the others; backs of all the toes with long curved hairs. Upper incisors close to the canines at their bases, separate in front, their cusps converging inwards and forwards.

Dentition.—I. $\frac{2}{6}$ or $\frac{2}{4}$, C. $\frac{1-1}{1-1}$, P. $\frac{2-2}{2-2}$, M. $\frac{3-3}{3-3}$ = 30 or 32.

Habits.—Insectivorous.

1. Nyctonomus plicatus, *Buchanan-Hamilton, sp.* (1800).

Plicated Bat.

Ears united by a low band in front, evenly and broadly rounded off above. Tragus very small and quadrate, the upper margin slightly concave. Upper lip very thick, deeply grooved by vertical wrinkles. No gular sac. Wing-membrane from the lower end of the tibia. Fur very soft and dense; above bluish- or smoky-black, below paler.

Dimensions.—Head and body about two and three-fourths inches; tail about one and three-fourths inch; forearm nearly two inches.

Habitat.—South Australia; Tasmania; Malay Peninsula; Java; Sumatra; Borneo; Philippine Islands; India.

References.—Dobson, B.M. Catal. Chiropt p. 425; Leche, Proc. Zool. Soc. 1884, p. 51.

2. Nyctonomus australis, *Gray, sp.* (1838).

White-striped Bat.

Ears large, their inner margins not united, but rising close together from distinct points of origin. Integument of the ear-conch rather thin. Tragus short and broad, the outer margin distinctly concave mesially. Upper lip with short vertical wrinkles. A large gular sac with outwardly projecting hairs in the male, and but little developed in the female. Wing-membrane from the distal third of the tibia. Fur moderately long and dense; above dark reddish-brown, below paler; in the male the fur covering the wing-membrane beneath the humerus and femur, from the sides of the body outwards is pure white; in the female white largely mixed with brown.

Dimensions.—Head and body about three inches; tail about one and three-fourths inch; forearm about two and a third inches.

Habitat.—Australia; New Guinea.

References.—Dobson, B.M. Catal. Chiropt. p. 433, pl. xxii. fig. 9 *(head)*; Gould, Mamm. Austr. iii. pl. xxxi.

3. Nyctonomus albidus, *Leche*, (1884).

Leche's White-striped Bat.

Differs from *N. australis* in the following particulars: Ears much longer than the head, and united by a low band. Integument of ear-conch thick and opaque. The gular sac and the white band of fur along the inner margin of the wing beneath fully developed in the female.

Dimensions.—Head and body about three and a half inches; tail about two inches; forearm about two and two-fifths inches.

Habitat.—South Australia.

Reference.—Leche, Proc. Zool. Soc. 1884, p. 50, fig. 3. A. *(front and lower view of head)*; B. *(side view of upper jaw)*; C. *(side view of lower jaw)*.

4. Nyctonomus norfolcensis, *Gray, sp.* (1839).

Norfolk Island Bat.

Ears triangular, shorter than the head, separate, the outer margin of the conch straight, the tip broadly rounded. Tragus triangular, rounded above. Muzzle flat and obtuse. Upper lip with shallow vertical wrinkles. Nostrils opening sublaterally. Gular sac small in the male, rudimentary in the female. Wing-membrane from the ankle. Fur reddish-brown above, paler beneath. Lower incisors six.

Dimensions.—Head and body rather more than two inches; tail about one and a fourth inch; forearm about one and a half inch.

Habitat.—Eastern Australia; Norfolk Island.

Reference.—Dobson, B.M. Catal. Chiropt. p. 439;

5. Nyctonomus petersi, *Leche* (1884).

Peters' Bat.

Differs from *N. norfolcensis* in the following particulars only. Nostrils opening forwards. Gular sac absent in both sexes. Wing-membrane arising from the tibia a short distance behind the ankle.

Dimensions.—Head and body about two and two-fifths inches; tail and forearm about one and a third inch.

Habitat.—South Australia.

Reference.—Leche, Proc. Zool. Soc. 1884, p. 49, fig. 1. A. *(side view of upper jaw)*; B. *(front view of lower jaw)*.

Order IV.—RODENTIA.

Terrestrial, rarely arboreal or natatorial, diphyodont, placental mammals of small size; with plantigrade or semiplantigrade, generally pentadactyle, unguiculate, rarely subungulate feet; with clavicles (sometimes imperfect or rudimentary); with never more than two incisors in the mandible, and without canines; premolars and molars rooted or rootless; with tuberculated or laminated crowns, and arranged in an unbroken series.

To the RODENTIA belong the greater number of living Mammals, and their distribution is practically cosmopolitan, but, as with the remaining Orders of EUTHERIA, they are not well represented in Australia, only one of the eighteen recognised Families being indigenous. The absence of canines and the large chisel-shaped incisors distinguish them from all other Mammals.

The dental formula is, as a rule, very constant, and may be cited typically as I. $\frac{1}{1}$, C. $\frac{0}{0}$, PM. $\frac{1}{1}$ or $\frac{0}{0}$, M. $\frac{3}{3}$.

There are usually five digits in the hand, the pollex, however, being sometimes rudimentary or even absent.

Family I.—MURIDÆ.

Rodents of various habit, but generally terrestrial; with contracted frontals; with the lower root of the maxillary zygomatic process more or less flattened into a perpendicular plate. Malar short and slender, generally reduced to a splint between the maxillary and squamosal processes. Typically with a high perpendicular infraorbital foramen, wide above and narrow below. Lower incisors compressed; molars rooted or rootless, tuberculate or with angular enamel folds; premolars none, except in *Sminthus;* pollex rudimentary; tail generaly subnaked and scaly.

The Rats constitute more than a third of the known Rodents, and are represented by thirty-five genera with a cosmopolitan distribution. The presence or absence of roots to the molars divide these into two distinct sections.

Subfamily I.—HYDROMYINÆ.

Molars $\frac{2}{2}$, divided into transverse lobes; infraorbital opening variable; incisive foramina very small.

Genus I.—HYDROMYS, *Geoffroy* (1805).

Molars two only in each ramus, divided into transverse lobes. Infraorbital opening crescentic, scarcely narrowed above, its external wall without an anteriorly projecting plate. Incisive foramina very small. Toes partially webbed.

Distribution.—Australia; Tasmania; New Guinea.

Dentition.—I. $\frac{1}{1}$, M. $\frac{2}{2}$ = 12.

Habits.—Strictly aquatic, frequenting banks of rivers, creeks, water-holes, and inlets of the sea. In their habits they are rather shy, and strictly nocturnal or crepuscular.

Note.—This and the succeeding genus differ from all other Rodents in the paucity of their molar teeth. Their food consists of mollusks, crustaceans, and other aquatic animals, along with vegetable products.

1. Hydromys chrysogaster, *Geoffroy* (1805).

Eastern Water Rat.

Fig. 4.

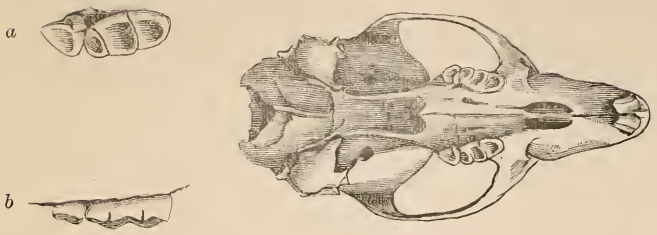

Fig. 5.

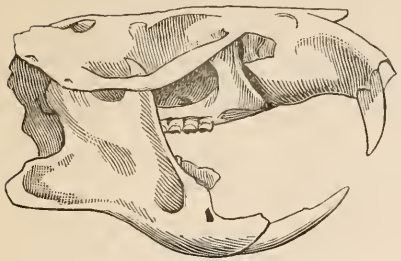

Fig. 6.

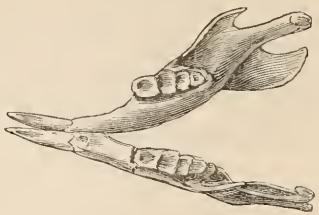

Fig. 4.—Under surface of skull to show palate and dentition (natural size). *a*, Upper molars, enlarged. *b*, Side view of same, enlarged.

Fig. 5.—Side view of skull and ramus (natural size).

Fig. 6.—Lower jaw.

Head, ears, back, outer surface of hind limbs, the body behind them, and the root of the tail grizzled black and buff, the former color predominating; sides of face and body, the entire under surface, and the inner side of the limbs rich deep reddish-orange or buffy-white; outer surface of arms deep brown; upper surface of hind feet pale glaucous-buff, passing into brown on the tips of the toes; basal half of tail black, apical half white.

Habitat.—Eastern Australia and Tasmania, ranging at least as far northwards as the Herbert River District.

References.—Gould, Mamm. Austr. iii. pls. xxiv. *(H. chrysogaster)* and xxvi. *(H. leucogaster)*; Thomas, Proc. Zool. Soc. 1889, p. 247, pl. xxix. fig. 7 *(anterior zygoma-root)*.

Note.—The two forms here mentioned, though for many years kept separate as distinct species, are now generally allowed to be mere color varieties of one species.

2. Hydromys fulvolavatus, *Gould* (1863).

Western Water Rat.

General color of fur orange-buff or buffy-brown, but the numerous black hairs which are dispersed over the upper surface give those parts a dusky hue; the whiskers, which in the other species are entirely black, are in this mixed black and white, outer surface of limbs dark brown; upper surface of hind limbs pale brown, deepening towards the toes; nails white; tail black, except the extreme tip which is white.

Habitat.—South and West Australia.

Reference.—Gould, Mamm. Austr. iii. pls. xxv. *(H. fulvolavatus)* and xxvii. *(H. fuliginosus).*

Note.—As with its eastern representative there are two distinct color varieties of the Western Water Rat. Mr. Oldfield Thomas apparently considers (v. Proc. Zool. Soc., 1889, p. 247) all six described forms of *Hydromys* to belong to one and the same species. His words are as follows: "One of the most singular, and at the same time the most isolated genera of *Muridæ* is *Hydromys*, of which the *only* species is the well-known Australian Water-rat." According to this *H. chrysogaster* is the name by which the sole species should be known.

Genus II.—XEROMYS, *Thomas* (1889).

External form murine. Tip of muzzle as in *Mus*, not as in *Hydromys*. Toes unwebbed. Tail scaly, very finely haired. Skull as in *Mus*, except that the supraorbital edges are rounded. teeth both in number and structure as in *Hydromys*. Infra-orbital foramen typically murine, the outer wall broad and slightly projecting forwards.

Distribution.—Queensland.

Dentition.—I. $\frac{1}{1}$ M. $\frac{2}{2}$ = 12.

Habits.—Terrestrial.

1. Xeromys myoides, *Thomas* (1889).

Thomas' Rat.

External appearance like that of an ordinary Rat. Ears short and rounded, laid forward they only reach to within three or four millimetres of the posterior canthus of the eye; their anterior edge without the supplementary flap found in *Hydromys*. Fur very short, uniform in length. Whiskers as in *Mus*, fewer and slenderer than in *Hydromys*. General color above dark slaty-gray, below white. Ears gray. Arms and legs like the back; hands and feet very thinly haired, almost naked terminally,

white. Palms and soles naked, the former with five, the latter with six pads, the last hind pad elongate. Pollex with a short broad nail, all the other digits with claws: fifth digit on each foot without claw, reaching just to the base of the fourth. Tail about the length of the body without the head, slender, scaly, the scales rather irregularly disposed, very small, averaging about twenty to twenty-two to the centimetre, the whole tail very thinly covered with fine white hairs; its substance pale flesh color above and below. Palate-ridges as in *Hydromys*, *i.e.* three predental, the third notched in the centre, three interrupted interdental ridges, and one uninterrupted posterior ridge. Mammæ 0 - 2 = 4. Upper incisors long, less curved than in *Mus;* their front surfaces smooth, ungrooved, and orange in color: lower incisors very long, their front surfaces white.

Habitat.—Port Mackay, Queensland.

Dimensions.— ♀ ad. Head and body about four and a half inches; tail about three and a half inches.

References.—Thomas, Proc. Zool. Soc. 1889, p. 247, pl. xxix. ff. 1 – 4 *(skull)*, 5 *(palate-ridges)*, 6 (*anterior zygoma-root*), 8 (*ear*), 9 (*right hind foot*), and 10 – 12 (*left upper and lower molars*).

Subfamily II.—Murinæ.

Rats and Mice.

Molars tuberculate, at least in youth. Cheek-pouches absent. Tail scaly, more or less naked.

This sub-family contains about two hundred and fifty species belonging to eighteen well defined genera.

Genus III.—MUS, *Linnæus* (1766).

Incisors narrow, not grooved: molars small, with three series of cusps across each tooth. Incisive foramina long. Coronoid process of lower jaw well developed. Eyes and ears large. Fur soft, sometimes mixed with spines. Pollex with a short nail instead of a claw. No cheek-pouches. Tail long, nearly naked, with rings of overlapping scales.

Distribution.—Eastern Hemisphere, except Madagascar.

Dentition.—I. $\frac{1}{1}$, M. $\frac{3}{3}$ = 16.

Mammæ.—Varying from six to twenty.

Habits.—Terrestrial or semiaquatic; fossorial; normally granivorous, but under pressure of hunger, or when a semidomesticated existence has been taken up—such, for instance, as in the case of the House Mouse, *Mus musculus*, and the Brown Rat, *Mus decumanus*—omnivorous.

Note.—"This, the typical genus of the Family (RODENTIA) is," Mr. Oldfield Thomas writes, "by far the largest of the Order, and indeed of the whole Class MAMMALIA, containing not less than one hundred and twenty species spread over the whole of the Old World with the exception of Madagascar. The number of species is, on the whole, much more considerable in tropical than in temperate regions, while but few are found where the climate is excessively cold." The following paragraph from the same pen is of more than ordinary interest, and to it we would call the attention of our northern zoologists, whose opportunities of examining the animals at different seasons and different altitudes so far exceeds ours. "It is an interesting fact in connection with climate that many of the species living in hot countries have their fur more or less mixed with flattened spines, and that *these spines appear to be shed during the winter and to be replaced by hairs*, the latter naturally affording a warmer covering for the animal than the former."

1. MUS FUSCIPES, *Waterh.* (1840).

Dusky-footed Rat.

Form stout; ears moderate; tail equal in length to the body; tarsi moderate; fur very long. General color above blackish-brown with an admixture of gray; below grayish-white. Feet brown: tail black, sparingly covered with short bristly hairs. Incisors orange.

Dimensions.—Head and body to six and a half inches; tail to four and a quarter inches.

Habitat.—The entire southern half of Australia; Tasmania; Islands of Bass' Strait.

References.—Waterhouse, Voy. Beagle, Mamm. p. 66, pl. xxv.; Gould, Mamm. Austr. iii. pl. ii.

Note.—This Rat is partial to the neighborhood of water, frequenting the banks of streams and lagunes, swampy localities among long grass and dense brush, and swims with great ease and rapidity.

2. MUS VELLEROSUS, *Gray* (1847).

Tawny Rat.

Form stout; ears moderate; tail shorter than the body; fur very long, close, and rather soft. General color above reddish-brown with interspersed whitish hairs; below paler. Feet and tail brown, the latter with a few short bristly hairs. Incisors yellow.

Dimensions.—Head and body to seven and a half inches; tail to four and a half inches.

Habitat.—Plains between the Murray and Glenelg Rivers, South Australia.

References.—Gray, Proc. Zool. Soc. 1847, p. 5; Gould, Mamm. Austr. iii. pl. xii.

3. Mus lineolatus, *Gould* (1845).

Plain Rat.

Ears moderate; tail longer than the body; fur long and very soft. General color above deep slate-gray, with the tips and the longer interspersed hairs black; below grayish-white more or less suffused with yellow; eye encircled with black. Feet rather small and white. Tail well clothed with small hairs, blackish above, white below.

Dimensions.—Head and body to five and a-half inches; tail to four and a half inches.

Habitat.—Darling Downs, frequenting the open parts of the grassy plains.

Reference.—Gould, Mamm. Austr. iii. pl. xviii.

4. Mus assimilis, *Gould* (1857).

Allied Rat.

Fur soft and silky. General color above light brown, very finely pencilled with black, below grayish-buff. Feet clothed with very fine silvery hairs. Tail nearly naked, slightly longer than the body.

Dimensions.—Head and body to seven and a quarter inches; tail to six inches.

Habitat.—From North-eastern Queensland to South-western Australia.

References.—Gould, Mamm. Austr. iii. pl. xiii.; Collett, Zool. Jahr. ii. 1886-7, p. 838.

5. Mus manicatus, *Gould* (1857).

White-footed Rat.

Habit medium; ears rather large. General color above black, gradually shading into the deep gray of the under surface; nose, fore part of the lips, stripe down the centre of the throat and chest, and all the feet, white; whiskers deep black. Tail naked, a little shorter than the body.

Dimensions.—Head and body up to seven inches; tail up to five inches.

Habitat.—York Peninsula; Mount Kosciusko.?

Reference.—Gould, Mamm. Austr. iii. pl. xvi.

6. Mus sordidus, *Gould* (1867).

Sordid Rat.

Habit stout. Ears rather large. Hair rather coarse and wiry. General color above grizzled black and brown, the former prevailing on the dorsal aspect; below grayish-buff; fore feet grayish-brown; hind feet silvery-gray; tail thinly clothed with extremely fine black hairs, about equal in length to the body.

Dimensions.—Head and body to six and three-fourths inches; tail to five inches.

Habitat.—Darling Downs.

Reference.—Gould, Mamm. Austr. iii. pl. xvii.

Note.—According to Gilbert its food consists mostly of the roots of stunted shrubs, and while it is common on the plains it is also found occasionally on the banks of creeks.

7. Mus longipilis, *Gould* (1863).

Long-haired Rat.

Fur very long, hairy, and somewhat harsh to the touch, of a grayish-brown at the base and tawny-buff at the tip, numerously interspersed especially along the back with very long, fine black hairs; below buffy-gray; feet flesh color, sparingly clothed with silvery hairs. Tail thinly beset with fine, stiff, black hairs.

Dimensions.—Head and body to seven and three-fourths inches; tail to five and three-fourths inches.

Habitat.—Victoria River?

Reference.—Gould, Mamm. Austr. iii. pl. xiii.

8. Mus velutinus, *Thomas* (1882).

Velvet-furred Rat.

Fur very long, soft, and velvety. General color above yellowish olivaceous gray, the hairs dark slaty-gray for nine-tenths of their length, with their extreme tips yellow, and intermixed with many longer black hairs: below bluish-gray, the bases of the hairs light slate color, and the tips dirty white. Ears, feet, and tail uniform dark brown.

Dimensions.—Head and body up to six and a third inches; tail to four inches.

Habitat.—Tasmania.

Reference.—Thomas, Ann. Nat. Hist. (5) ix. 1882, p. 415, fig. 4 *(front edge of anterior zygoma-root).*

9. Mus burtoni, *Ramsay* (1887).

Burton's Rat.

Fur close, thick, soft, of uniform texture, almost woolly. Ears moderate. Tail not quite the length of the body, naked. General color above uniform dull ashy-gray or mouse color, below lighter gray. Whiskers black, reaching to behind the ears.

Dimensions.—Head and body—of type specimen—four and four-fifths inches; tail four and one-tenth inches.

Habitat.—Derby, North-western Australia.

Reference.—Ramsay, Proc. Linn. Soc. N.S. Wales, (2) ii. p. 553, pl. xvii. figs. 1 – 3. *(skull)*, 4 (*hind foot*) and 5 *(fore foot)*.

10. Mus terræ-reginæ, *Alston* (1879).

Gray's White-footed Rat.

Fur stiff and harsh both above and below, most of the hairs being developed into flattened channelled spines; many longer cylindrical hairs on the back. Tail almost naked, considerably shorter than the head and body. Whiskers mixed black and white. Ears rather large, rounded, and naked. Feet very large and stout. General color above dark reddish-brown, the longer hairs black; lips, lower parts of cheeks, all the under surfaces, and feet yellowish-white; tail dusky, irregularly marked with yellowish patches and rings.

Dimensions.—Head and body to eight and a quarter inches; tail to rather more than seven inches.

Habitat.—Cape York, Queensland.

References.—Gray, Proc. Zool. Soc. 1867, p. 598 (as *Acanthomys leucopus*); Alston, op. cit. 1879, p. 646.

11. Mus gouldi, *Waterhouse* (1840).

Gould's Rat.

Ears rather large; tail shorter than the head and body; tarsi slender; fur long and soft. General color pale ochreous-yellow, interspersed above with numerous long black hairs; entire lower surfaces, the feet, and the claws, white; ears brown; tail brown above, yellowish-white below; upper incisors deep orange, lower yellow.

Dimensions.—Head and body to four and two-thirds inches; tail to three and a half inches.

Habitat.—Southern and Eastern Australia.

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Note.—Gould (l.c.) gives *Mus greyi*, Gray, in Grey's Travels in Australia (App. ii. p. 410, 1841), as a synonym of *Mus gouldi;* this, however, appears to be an error, Gray's species being, according to Thomas and Collett, valid.

12. Mus greyi, *Gray* (1841).

Grey's Rat.

General color above intense reddish-brown, interspersed with long, slender, pale tipped, black hairs; sides yellowish-brown; lower surfaces yellowish; feet reddish-brown; ears nearly naked, with short grayish hairs; tail brown, much shorter than the head and body.

Dimensions.—Head and body to six inches; tail to four and three-fourths inches.

Habitat.—From South Australia to North-eastern Queensland.

References.—Waterhouse, Voy. Beagle, i. p. 67, pl. xxxiv. fig. 18 *(molars)*; Gould, Mamm. Austr. iii. pl. xix.

References.—Gray, Grey's Trav. Austr. App. ii. p. 410; Collett, Zool. Jahr. ii. 1886-7, p. 837.

Note.—Prof. Collett observes that this species "takes the place in houses of *Mus decumanus*" in the Herbert River District.

13. Mus nanus, *Gould* (1857).

Little Rat.

Fur coarse. General color above and the outer sides of the limbs brown, with numerous interspersed fine black hairs; below grayish-white, becoming lighter and forming a conspicuous patch beneath the tail; feet light brown; base of the fur bluish-gray; tail brown, shorter than the head and body.

Dimensions.—Head and body to four inches; tail to three and a fourth inches.

Habitat.—West Australia.

Reference.—Gould, Mamm. Austr. iii. pl. xx.

14. Mus albocinereus, *Gould* (1845).

Grayish-white Mouse.

Habit rather stout; ears moderate; tail nearly equal in length to the head and body; tarsi very slender; fur very long and soft. General color pale ashy-gray, with a slight brownish tint on the hinder part of the back; below white with a faint grayish tinge; head grayish-white, pencilled with black; feet and tail white, the latter with scattered black hairs above.

Dimensions.—Slightly larger than *Mus musculus.*

Habitat.—West Australia.

References.—Gould, Mamm. Austr. iii. pl. xxi.

Note.—Gould remarks: "This pretty little Mouse inhabits the sandy districts bordering the sea-shore, particularly those at the back of the sand-hills to the northward of Freemantle."

15. Mus novæ-hollandiæ, *Waterhouse* (1842).

Common Field Mouse.

Tail not nearly so long as the head and body. Tarsi rather long and slender; fur rather long and very soft. General color above deep gray, tipped with brownish-yellow; below less deep gray, tipped with white; tail dusky above, white below.

Dimensions.—Head and body to three inches; tail to two inches.

Habitat.—New South Wales.

References.—Waterh., Proc. Zool. Soc. 1842, p. 146; Gould, Mamm. Austr. iii. pl. xxii.

16. Mus delicatulus, *Gould* (1842).

Pigmy Mouse.

Ears small; tarsi delicate; tail slender, nearly as long as the head and body; fur soft and short. General color above pale yellowish-brown; sides delicate yellow; lower part of the sides of the muzzle, entire under surfaces, and feet, white; fur of uniform color on the throat and mesial line of the abdomen.

Dimensions.—Head and body to two and a half inches; tail to two and a fourth inches.

Habitat.—Port Essington.

Reference.—Gould, Mamm. Austr. iii. pl. xxiii.

17. Mus tompsoni, *Ramsay* (1881).

Tompson's Rat.

Tail longer than the head and body; fur above rather harsh, below soft. General color above light gray, with a fulvescent tinge, pencilled with black; whiskers long and black, some near the angle of the mouth white; lower surfaces pure white; hands rather small, gray above; feet and claws white; tail blackish, the hairs very short.

Dimensions.—Head and body to six and two-thirds inches; tail to seven and a half inches.

Habitat.—Interior of New South Wales.

Reference.—Ramsay, Proc. Zool. Soc. N.S. Wales, vi. p. 763, figs. 1 *(pinna)*, 2 *(under surface of hand)* and 3 *(ditto of foot)*.

Note.—Dr. Ramsay is undecided as to whether this species should be placed in the genus *Mus* or in *Hapalotis (Conilurus* of this work).

18. Mus argurus, *Thomas* (1889).

White-tailed Rat.

Tail rather longer than the head and body. Ears rounded, reaching just beyond the middle of the eye when laid forward. General color above pale sandy-rufous, the hairs slate-colored basally; muzzle and underside of body white, the hairs of the chest and belly rufous basally; hands and feet pure white; tail wholly white, more thickly clothed than usual, the tip slightly pencilled.

Dimensions.—Head and body to three and a third inches; tail to four inches.

Habitat.—South Australia.

Reference.—Thomas, Ann. Nat. Hist. (6) iii. 1889, p. 433, fig. p. 434 *(upper molar teeth).*

Note.—As in the case of Dr. Ramsay's species just described, Mr. Thomas was undecided as to the exact position to which to assign this curious form; he remarks: "*Mus argurus* has the external characters and the skull of *Mus*, with the molars of *Hapalotis;* and I am somewhat in doubt as to which of the two it should be put into. It seems indeed probable that the characters of these two genera will be found so to blend together in the different species as to necessitate their ultimate union, notwithstanding the very striking characters presented by the more typical species of *Hapalotis.*"

The following eight forms of *Mus*, which have been described by Messrs. Higgins & Petterd from Tasmania, are here introduced for the sake of comparison with southern continental species, as it is impossible for the writer with the data to hand to form an opinion as to their validity or otherwise. It is not, however, at all probable that the small island of Tasmania should possess no less than eleven indigenous species of *Mus*, while but seventeen have been described from Australia, one only being common to both islands.

19. Mus griseocæruleus, *H. & P.* (1882).

Blue Rat.

Ears naked and moderately long; tail shorter than the head and body, sparsely clothed; fur long. General color above bluish-gray, sides and below ashy-gray; feet clothed with short yellow hairs, tail with short stiff black hairs.

Dimensions.—Head and body to seven and a half inches ; tail to six and three-fourths inches.

Habitat.—Northern Tasmania.

Reference.—Higgins & Petterd, Proc. Roy. Soc. Tas. 1882, p. 173, with plate, figs. 2, 2*a*.

20. Mus leucopus, *H. & P.* (1882).

Short-tailed Rat.

Ears long ; tail very much shorter than head and body ; fur long and soft. General color above dark brown tipped with pale fulvous-brown, below dirty ashy-gray ; snout gray, the extreme tip nearly white ; ears clothed with almost black hairs ; tail above with short dark hairs mixed with paler, below with white hairs ; feet white.

Dimensions.—Head and body to five and three-fourths inches ; tail to three and three-fourths inches.

Habitat.—Northern Tasmania.

Reference.—Higgins & Petterd, Proc. Roy. Soc. Tas. 1882, p. 174, with plate, figs. 4, 4*a*.

Note.—Should this prove to be a good species the name will require to be altered.

21. Mus variabilis, *H. & P.* (1882).

Swan's Rat.

Ears rather large, broad, very much rounded above, and almost naked ; tail equal in length to the head and body ; fur rather long and soft. General color above dark bluish-gray or fawn, below pale bluish-gray or white ; feet brownish, fawn color, or white ; tail dark brown.

Dimensions.—Head and body to eight inches ; tail to the same length.

Habitat.—Tasmania (St. Leonards).

Reference.—Higgins & Petterd, Proc. Roy. Soc. Tas. 1882, p. 174, with plate, figs. 3, 3*a*.

22. Mus simsoni, *H. & P.* (1882).

Simson's Rat.

Ear moderately long ; tail longer than the head and body, thickened at the base. General color above grayish-brown interspersed with darker hairs, paler below ; face bluish-gray ; chin white ; ears brown ; feet yellowish-white ; tail pale brown.

Dimensions.—Head and body to two and five-eighths inches; tail to two and seven-eighths inches.

Habitat.—Tasmania (Ringarooma).

Reference.—Higgins & Petterd, Proc. Roy. Soc. Tas. 1882, p. 175, with plate, figs. 5, 5*a*.

23. Mus pachyurus, *H. & P.* (1883).

Thick-tailed Rat.

Ear moderate, rounded; tail thick, sparsely clothed, much shorter than the head and body; fur moderately long and rather soft. General color above dark brown, below paler, especially behind, where it is grayish-brown. Fore feet thickly clothed with long brown hair, hind feet moderately so; tail brown. Incisors yellow at the tip, white at the base.

Dimensions.—Head and body to six and three-fourths inches; tail to four and one-eighth inches.

Habitat.—Tasmania (Long's Plains).

Reference.—Higgins & Petterd, Proc. Roy. Soc. Tas. 1883, p. 182, with plate, figs. 1 - 1*b*.

Note.—The molar teeth, if correctly figured, would necessitate the exclusion of this animal from the genus *Mus* as now restricted.

24. Mus castaneus, *H. & P.* (1883).

Chestnut-colored Rat.

Form very robust. Ears broad and roundly pointed; tail much shorter than the head and body; fur very long, dense, and soft. General color above chestnut, interspersed with longer black hairs, below yellowish-ash; nose, chin, and throat leaden-gray; fur on the cheeks excessively long and bushy; tail brown above, lighter below; hands and feet leaden-gray. Upper incisors orange, lower yellow.

Dimensions.—Head and body to six and three-fourths inches; tail to four and three-eighths inches.

Habitat.—Tasmania (Long's Plains).

Reference.—Higgins & Petterd, Proc. Roy. Soc. Tas. 1883, p. 185, with plate, figs. 2 - 2*b*.

25. Mus tamarensis, *H. & P.* (1883).

Tasmanian Water Rat.

Ears rounded; tail a trifle shorter than the head and body; fur somewhat coarse and moderately long. General color above

mottled yellowish-brown, below grayish-white ; a dark patch at the anterior portion of the base of the ear ; fore feet grayish-white, hind feet and toes long and slender, pure white ; tail brown above, grayish-white below, with the tip almost black.

Dimensions.—Head and body to six and three-fourths inches ; tail to six and a half inches.

Habitat.—Northern Tasmania.

Reference.—Higgins & Petterd, Proc. Roy. Soc. Tas. 1883, p. 185.

Note.—The authors of the species state that *M. tamarensis* is "extremely abundant on the banks of the river Tamar, and probably widely distributed over the island. Settlers residing near the river suffer much from its destructive propensities."

In a later paper by the same authors describing yet another new Tasmanian species of *Mus*, a list of the "Terrestrial Animals of Tasmania" is given. From this list the name of *M. tamarensis* is omitted, although no comment is made by the authors on the reason for the excision of this their latest species.

26. Mus tetragonurus, *H. & P.* (1883).

Quadrangular-tailed Rat.

Form stout ; ears short and broadly rounded ; tail short, quadrangular ; fur very long and soft. General color above dark ashy-gray, thickly interspersed with longer blackish hairs ; lips and entire under surface slaty-gray ; hands and feet ashy-gray ; tail brown.

Dimensions.—Head and body to six inches ; tail to less than four inches.

Habitat.—Tasmania.

Reference.—Higgins and Petterd, Proc. Roy. Soc. Tas. 1883, p. 195.

Genus IV.—CONILURUS, *W. Ogilby* (1838).

Hind limbs more or less elongated. Incisive foramina very large. No coronoid process to the lower jaw. Ears and tail long.

Distribution.—Australia.

Dentition.—I. $\frac{1}{1}$, M. $\frac{3}{3} \times 2 = 16$.

Note.—I have been reluctantly obliged to abandon the better known name *Hapalotis* (Lichtenstein, 1829), in favor of the above, proposed by my father, since the former name was used by Hübner in 1816 for a genus of Lepidopterous insects, and

cannot, therefore, be utilized again. The species on which the genus *Conilurus* was founded was named by its describer *C. constructor*, but further researches have proved its identity with the *Hapalotis albipes* of Lichtenstein. Major Mitchell's original specimens were forwarded to the British Museum under the name of "Native Rabbit," and the generic term selected above is intended to signify a "small rabbit with a long tail."

These graceful little animals supply in Australia the place of the Jerboas of Africa, South-eastern Europe, and Southern and Central Asia.

1. CONILURUS ALBIPES, *Lichtenstein, sp.* (1827).

White-footed Jerboa-Rat.

Tail equal in length to the head and body or but little shorter; fur long, soft, and close. Upper surface of the head and body, the ears, flanks, and outer surface of the limbs gray, tipped with ashy-brown, interspersed with numerous fine black-tipped hairs; whiskers and a narrow band encircling the eye black; under surface of body, inner surface of limbs, hands, and feet white; tail above dark brown, sides, below, and extreme tip white.

Dimensions.—Head and body to ten inches; tail about the same length.

Habitat.—South-eastern Australia; southern portion of South Australia.

References.—Ogilby, Trans. Linn. Soc. 1838, xviii. (description) p. 126, as *C. constructor*; Gray, Ann. Nat. Hist. ii. 1839, p. 308; Gould, Mamm. Austr. iii. pl. i.

Note.—According to Gould this species, though widely dispersed within the limits indicated above, is nowhere very abundant. It is "strictly nocturnal in its habits, sleeping during the day in the hollow limbs of prostrate trees, or such hollow branches of the large *Eucalypti* as are near the ground, in which situations it may be found curled up in a warm nest of dried leaves." Fossil remains of this species have been obtained in the Pleistocene of New South Wales.

The following remarks from the pen of Sir George Grey touching the method of carrying its young, adopted by this species and possibly by others of its congeners, but so totally at variance with the habits prevailing in the intimately allied genus *Mus*, are worthy of reproduction; he writes, "The specimen I send you, a female, had three young ones attached to its teats when it was caught: the mother has no pouch, but the young attach themselves with the same or even greater tenacity than is observable in the young of *Marsupiata* (METATHERIA of this Hand-list,

vide p. 4). "While life remained in the mother," he continues, "they remained attached to her teats by their mouths, and grasped her body with their claws, thereby causing her to present the appearance of a Marsupial *minus* the pouch. On pulling the young from the teats of the dead mother, they seized hold of my glove with the mouth, and held on so strongly that it was difficult to disengage them."

Should the above account be correct,—and with an observer whose veracity and accuracy are unquestionable, there can be no reason for doubting the statement,—and should the same habit be common to all, or even some, members of the genus,—I have failed to elicit any further information on the subject, either confirmatory or rebutting, from experienced zoologists and collectors—it raises the question whether *Conilurus*, a genus purely belonging to, and even in a fossil state so far confined to, continental Australia, may not originally have been a marsupial Rodent, which is even now in a transition stage between the Metatherian and Eutherian types. The fact of Thomas' *Mus argurus* having such close affinities (*vide* p. 110) to both genera, that even that talented writer is unable to say for certain to which genus this South Australian mammal belongs, would seem to strengthen the position here put forward. The discovery also by Dr. Stirling of the so-called "Marsupial Mole" *(Notoryctes)*, a form, which some of the foremost scientists of the age consider to be closely allied to the South African Golden Mole *(Chrysochloris)*, and in which the pouch is aborted or at the least rudimentary, again points to a gradual supersession of the older marsupial forms, and their immergence with the more recent and more highly developed monodelphian type.

2. Conilurus macrurus, *Peters, sp.* (1876).

Peters' Jerboa-Rat.

Ears large and rounded; tail much longer than the head and body; fur soft. General color above reddish-brown, intermixed with scattered longer black hairs; below white; ears rust-colored; feet clothed with short white hairs: proximal fourth of the tail brown, clothed with short scattered bristles; the rest densely covered with gradually lengthening white hairs, which at the tip exceed an inch in length.

Dimensions.—Head and body to eight and a quarter inches; tail to twelve and a half inches.

Habitat.—North-western Australia.

Reference.—Peters, Mon. Ak. Berl. 1876, p. 355, plate, p. 366.

3. Conilurus boweri, *Ramsay, sp.* (1886).

Bower's Jerboa-Rat.

Ears small, with the tips rounded, and almost naked; tail longer than the head and body. General color above light gray, pencilled with long black hairs; a broad, distinct, irregular, median band, rufescent on the nape and basal inch of the tail, golden-brown on the intervening portions; next two inches of tail blackish, the rest white, terminating in a well defined brush; under surfaces and feet white.

Dimensions.—Head and body up to eleven inches; tail to about thirteen inches.

Habitat.—North-western Australia.

Reference.—Ramsay, Proc. Linn. Soc. N. S. Wales (2) i. 1886, p. 1153, pl. xviii.

Note.—This species is very closely allied to the preceding; in fact, if it were not for the difference in the comparative dimensions of trunk to tail, I should have no hesitation in considering them identical.

4. Conilurus apicalis, *Gould, sp.* (1851).

White-tipped Jerboa-Rat.

General color above pale brown, interspersed with numerous fine black hairs; below white; face and sides of neck bluish-gray; flanks mixed gray and buffy-white; fore feet white with a dark brown spot on the fore-arm, hind feet and tarsi white; proximal three-fourths of the tail brown, the remaining portion thinly clothed with white hairs.

Dimensions.—Head and body to eight inches; tail to eight and a half inches.

Habitat.—South Australia.

Reference.—Gould, Mamm. Austr. iii. pl. ii.

Note.—This species has been found in a fossil state in the Pleistocene of New South Wales.

5. Conilurus hemileucurus, *Gray, sp.* (1857).

Elsey's Jerboa-Rat.

Ears short; tail shorter than the head and body; fur harsh and wiry. General color above light sandy-brown, with numerous scattered fine long black hairs; below buffy-white, the feet, fore-arms, and tarsi even lighter; basal portion of the tail brown, deepening into black about the middle, beyond which it is white with a short apical tuft.

Dimensions.—Head and body up to eight inches; tail to six and a half inches.

Habitat.—Central Queensland.

Reference.—Gould, Mamm. Austr. iii. pl. iii.

6. Conilurus hirsutus, *Gould, sp.* (1842).

Long-haired Jerboa-Rat.

Tail much longer than the head and body; fur coarse and shaggy. General color above yellowish-brown with very numerous longer interspersed black hairs; below rusty yellow tinged with brown on the neck and chest; feet black, the claws whitish; basal three-fourths of tail black, the remainder rusty white, the apical tuft exceeding an inch in length.

Dimensions.—Head and body up to ten and a third inches; tail to thirteen inches.

Habitat.—Northern Queensland.

References.—Gould, Proc. Zool. Soc. 1842, p. 12, and Mamm. Austr. iii. pl. iv.

7. Conilurus penicillatus, *Gould, sp.* (1842).

Black-tailed Jerboa-Rat.

Tail slightly longer than the head and body; fur rather spiny. General color above grayish-brown grizzled with buff, the occiput and neck tinged with rusty; entire under surfaces, inner surfaces of the legs, and the feet white with a faint yellow tint; apical half of the tail black and moderately tufted.

Dimensions.—Head and body up to seven and a quarter inches; tail to seven and three-fourths inches.

Habitat.—Northern Queensland.

References.—Gould, Proc. Zool. Soc. 1842, p. 12, and Mamm. Austr. iii. pl. v.

Note.—Writing of the habits of *C. penicillatus*, Mr. Gilbert (*vide* Gould) remarks, "this little animal is only seen on the beach where there are large *Casuarina* trees, in the dead hollow branches of which it forms a nest of fine dry grass, and retires during the day; in the evening it leaves its retreat and proceeds to the beach, where it may be seen running along at the edge of the surf as it rolls up and recedes, apparently feeding upon any animal matter washed up by the waves." Personally Gould states that "its habits would seem to be somewhat singular, inasmuch as it is frequently found among the swamps on the sea-shore; *I have no evidence, however, that it is not also found in the interior of the country.*"

8. CONILURUS PERSONATUS, *Krefft, sp.* (1867).

Krefft's Jerboa-Rat.

Tail much shorter than the head and body; fur coarse. General color above reddish-brown, below sandy white; a black mark surrounding the eye and continued along the side of the snout. Tail covered with coarse irregular scales, between which a few stiff hairs are visible.

Dimensions.—Head and body up to nine inches; tail to six and a half inches.

Habitat.—Northern Queensland.

Reference.—Krefft, Proc. Zool. Soc. 1867, p. 318.

9. CONILURUS CONDITOR, *Gould, sp.* (1849).

Nest-building Jerboa-Rat.

Ears large; tail equal in length to the head and body; fur soft and silky. General color above grayish-brown, darkest down the middle of the head and back; below pale buff; hands brown; feet very large, pale brown; tail brown above, paler beneath.

Dimensions.—Head and body six inches.

Habitat.—Interior of Eastern Australia.

References.—Ogilby, Trans. Linn. Soc. 1838, xviii. p. 127 (habits); Gould, in Sturt's Exped. into Centr. Austr. i. p. 120, and ii. App. p. 7, and Mamm. Austr. iii. pl. vi.

Note.—This species has received its specific name from its habit of constructing a large nest in which one or more families dwell; in the latter case, however, each family occupies a separate compartment, but with a passage communicating between them; these nests are built of small sticks, and are so firmly put together as to defy the attacks of a dog. The nests are somewhat in the form of a beehive, with a diameter of about four feet and a height of about three, and the method of construction is thus described by Major Mitchell: "For this purpose the little animal chooses some small bush or shrub as a fixed *point d'appui* to commence its operations; and by gradually working round this, and interlacing the materials of its fortalice, first of all with the growing branches of the centre bush, and afterwards with one another gradually extends it to the enormous dimensions specified." The inhabited compartments are warmly lined with grass.

10. CONILURUS MURINUS, *Gould, sp.* (1845).

Mouse-like Jerboa-Rat.

Ears large. Tail much shorter than the head and body; fur remarkably soft and delicate. General color above delicate

ochraceous-yellow with a considerable admixture of black; below buffy-white, as also are the hands and feet; tail moderately clothed, above mixed black and white, below pure white.

Dimensions.—Head and body up to five and a half inches; tail to three and three-fourths inches.

Habitat.—Interior of New South Wales and South Australia.

Reference.—Gould, Mamm. Austr. iii. pl. vii.

11. Conilurus longicaudatus, *Gould, sp.* (1844).

Long-tailed Jerboa-Rat.

Ears large and naked. Tail much longer than the head and body; fur close and very soft. General color above pale sandy, intermixed with numerous fine black hairs, which are longest posteriorly; below white; ears dark brown; feet and tarsi white; basal half of the tail clothed with short dark brown hairs, apical half with longer black hairs tipped with white, the extreme tip white.

Dimensions.—Head and body up to seven inches; tail to nine inches.

Habitat.—Interior of Western Australia.

References.—Gould, Mamm. Austr. iii. pl. viii.

Note.—Gould on the authority of Gilbert states that "the favorite haunt of this species is a stiff and clayey soil. It is also very partial to the mounds thrown up by *Bettongia grayi (B. lesueuri* of this work) and *Peragale lagotis*. It is less destructive to the sacks and bags of the storerooms, but, like *H. mitchelli*, is extremely fond of raisins."

12. Conilurus mitchelli, *Ogilby, sp.* (1838).

Mitchell's Jerboa-Rat.

Ears moderate, naked, and somewhat pointed; tail longer than the head and body; fur close and very soft. General color above very pale sandy, intermixed with fine black hairs which are longest posteriorly; sides of face, under surface, inner side of the limbs, and the feet grayish-white; a broad patch down the middle of the throat and chest pure silky white; ears dark brown; upper surface of the tail dark brown, and crested towards the tip; lower surface white.

Dimensions.—Head and body up to four and three-fourths inches; tail to six inches.

Habitat.—South and West Australia.

References.—Ogilby, Proc. Linn. Soc. 1838, xviii. p. 130; Gould, Mamm. Austr. iii. pl. ix.

Type.—In the Australian Museum.

Note.—Gould remarks that this species differs from the preceding in preferring sandy districts, frequenting the sides of grassy hills tolerably well clothed with small trees growing in a light soil, in which it forms its burrow.

13. Conilurus cervinus, *Gould, sp.* (1851).

Fawn-colored Jerboa-Rat.

Ears very large, pointed, and nearly naked; tail longer than the head and body. General color above delicate fawn intermixed with numerous fine black hairs; nose and under surfaces white; tail pale brown above, lighter below.

Dimensions.—Head and body up to four and a half inches; tail to five and a half inches.

Habitat.—Interior of South Australia.

Reference.—Gould, Mamm. Austr. iii. pl. x.

Genus V.—MASTACOMYS, *Thomas* (1882).

Similar to *Mus*, but with the molars remarkably broadened and the mammæ reduced in number to four.

1. Mastacomys fuscus, *Thomas* (1882).

Broad-toothed Rat.

Ears rather large; tail shorter than the head and body; fur extremely long and soft. General color both above and below dark grayish-brown; tail and upper side of feet clothed with dark brown hairs, those on the former not lighter below. Sole-pads five on the fore and six on the hind feet. Molars remarkably broad and heavy, the anterior ones each more than half as broad again as the palatal space between them; middle lamina of the first molar and anterior lamina of the second with three cusps; the additional ones external and very small.

Dimensions.—Head and body up to five and three-fifths inches; tail to three and three-fourths inches.

Habitat.—Tasmania.

Reference.—Thomas, Ann. Nat. Hist. (5) ix. p. 413, figs. 1 *(inner view of upper jaw, &c.)*, 2 *(molars)*, and 3 *(front edge of anterior zygoma-root)*.

Note.—Fossil remains of this Rat have been obtained from the Wellington Caves, New South Wales.

Genus VI.—UROMYS, *Peters* (1867).

Differs from *Mus* in having the scales of the tail not overlapping, but set edge to edge, so as to form a sort of mosaic work.

Distribution.—From Eastern Australia to the Aru Islands.

1. Uromys macropus, *Gray, sp.* (1866).

Giant Rat.

Ears moderate ; tail equal to or a little shorter than the head and body ; fur moderately soft, the long hairs rather bristly. General color above grayish-brown tinged with reddish, with coarse black-tipped hairs intermixed ; below white ; whiskers very long, stiff, and black ; feet white ; tail black on the basal, white or pale yellow on the apical half.

Dimensions.—Head and body up to fourteen and a half inches; tail to about the same length.

Habitat.—North-Eastern Australia.

Reference.—Gray, Proc. Zool. Soc. 1866, p. 221, and 1867, p. 597 ; Krefft, Proc. Zool. Soc. p. 316, figs. 1 – 7 *(skull)* ; Peters, Mon. Ac. Berl. 1867, p. 344 *(animal, skull, and feet figured).*

2. Uromys cervinipes, *Gould, sp.* (1852).

Buff-footed Rat.

Fur short, soft, and adpressed, without lengthened hairs. General color of adult : above sandy-brown, below mottled buffy-white and gray ; feet and tarsi fawn color ; tail purplish-flesh color. Young bluish-gray above, grayish-white below.

Dimensions.—Head and body about six inches ; tail about five and a half inches.

Habitat.—Eastern Australia.

Reference.—Gould, Mamm. Austr. iii. pl. xiv.

In 1867 Gray (Proc. Zool. Soc. p. 599) described, under the name of *Echiothrix leucurus (lege Echinothrix leucura)* a remarkable Rat, having an extremely elongated muzzle, supposing it to have come from North Australia ; it is now believed to be confined to the Celebes, whence only has it since been recorded.

Numerous fossil Murine remains have been obtained in various parts of Australia, chiefly in the Wellington Caves, but no systematic attempt has been made as yet to work these out.

Order V.—CARNIVORA.

Unguiculate Mammals with never less than four well developed toes on each foot, all of which are usually clawed. Pollex and hallux never opposable to the other digits. Dentition diphyodont and heterodont, the teeth always rooted, consisting, in each ramus, of generally three incisors, the outer one being always the largest; of a strong, conical, pointed, recurved canine, and of a variable but usually more or less compressed, pointed, and trenchant series of molars. Brain never destitute of well marked convolutions. Stomach simple. Cœcum absent or short and simple. Mammæ abdominal and variable in number. Clavicle often entirely absent, and when present never complete.

Habits.—Carnivorous and sanguivorous, sometimes omnivorous.

Suborder I.—Fissipedia.

Carnivores fitted for a terrestrial or mainly terrestrial progression and mode of life. Incisors almost always $\frac{3}{3}$ on each side. In the molar series there is always one specially modified tooth in each ramus, which is termed the "sectorial" or "flesh-tooth," and is usually enlarged; in the upper this tooth is the last premolar, in the lower the first molar.

Group—CYNOIDEA.

Head elongate; tail moderate or rather long; limbs fairly developed, the feet digitigrade. Fore toes, except in the African genus *Lycaon*, five, the pollex, however, being short and non-functional; hind toes in all wild species four. Claws blunt, nearly straight, and non-retractile. Organs of scent, sight, and hearing highly developed. Auditory bulla much dilated, rounded, and subdivided. Paroccipital process flattened against the bulla and projecting behind. Condyloid and glenoid foramina distinct. Cœcum elongate and generally folded on itself. Clavicles rudimentary.

Vertebræ.—C. 7, D. 13, L. 7, S. 3, Cd. 17 - 22.

Habits.—Carnivorous, but some, especially of the smaller forms, are omnivorous. Many of the species, such as the Wolf and the Cape Hunting Dog, are gregarious and hunt in packs, others, as for instance the Fox, hunt singly or at most in pairs, and show extraordinary cunning both in avoiding danger to themselves and in securing their prey; many are fossorial.

Note.—Prof. Huxley has divided this Group into two parallel series, the Thooid or Lupine forms and the Alopecoid or Vulpine forms, characterised by the presence of frontal air-sinuses in the

former, which not only affect the external contour but to a still greater degree the shape of the anterior part of the cranial cavity. It is to the first of these series that the Australian species belongs. Thooid forms are not found in Africa or South America.

Family I.—CANIDÆ.

Characters similar to those of the Group of which this is the only family.

Genus I.—CANIS, *Linnæus* (1766).

Pupil, when contracted, round in some species, elliptical and vertical in others. Limbs of moderate proportions. Tail generally forming a moderate brush. Mammæ generally ten, more rarely eight. Teeth powerful.

Dentition.—I. $\frac{3}{3}$, C. $\frac{1}{1}$, P. $\frac{4}{4}$, M. $\frac{3}{3}$, × 2 = 42.

Flower and Lydekker (Introduction to the Study of Mammals living and extinct, p. 546) remark: "The absence of the last upper molar (m^3) alone distinguishes this from the generalised dentition of heterodonts, and this tooth is occasionally present in one species *(C. cancrivorus).* In certain Asiatic species *(C. primævus* and its allies) which on this account have been separated to form the genus *Cyon* of Hodgson, the last lower molar (m_3) appears to be constantly absent." The first permanent premolar in both jaws is without a milk-predecessor, and in the upper jaw is decidedly smaller than the second.

Distribution.—Cosmopolitan.

1. Canis dingo, *Blumenbach* (1780).

Warrigal; Dingo; Native Dog.

Of this too well known animal it is hardly necessary to give a description, more especially as it is the only terrestrial Carnivore existing in a wild state on Australian soil; nevertheless, the remarks of Prof. St. George Mivart on the subject may be suitably reproduced here. He writes:—

"The Dingo varies in its coloration from red to black. There is a grayish underfur, but, save in the black variety, the long hairs are generally yellow or whitish. The top of the head and dorsal region generally are of a darker reddish-yellow, often intermixed with black. The underparts are paler and may be whiteish. The end of the tail is very often white, as are frequently

the feet and sometimes the muzzle, though this is also sometimes black. The animal may be of an uniformly light reddish or yellowish brown, save that it is paler beneath, on the outside of the forelegs, below the elbow, as well as on the inside of the limbs and on the cheeks."

In reference to the vexed question as to whether the Warrigal is an indigene or has been brought hither through human instrumentality, we consider, notwithstanding that the greater number of authors incline to the latter theory, that the recognition by Prof. McCoy of fossil remains, in no wise differing from those of recent individuals, and contemporaneous with similar remains of *Thylacoleo*, *Diprotodon*, &c., sets this question at rest, and goes far towards proving that this species is indigenous to continental Australia, and was an inhabitant thereof prior to its colonization by man, no human remains of such antiquity having as yet been discovered.

As this question is so intimately connected with that of the origin of the domestic dog and its many varieties, no apology is needed for quoting largely from Prof. McCoy's article (Prod. Palæont. Vict. dec. vii. pp. 7 – 10). He says:—

"The origin of the domestic dog is a question of great difficulty and interest, which it has been suggested can be best investigated by a study of the Dog known to the lowest types of the human race; and the aboriginal inhabitants of Australia were thought to afford these conditions. On the other hand the remarkable absence of the higher forms of Mammalian Quadrupeds in Australia was supposed to render it highly probable that the Dingo was not really a native of the place, but was brought at some remote period from some other country by human savage races arriving to constitute the population of Australia. Taking the case of the Dingo, it was certain that the native dogs of continental Asia were not clearly related, to the extent of specific identity, with the Australian one, nor could any near analogies be found elsewhere; while on the other hand the facts are beyond dispute: (1st) that the Dingo is singularly averse to domestication and man's society when compared with other dogs; (2nd) that it is extremely abundant, with little or no variation, over the whole of Australia; and (3rd) that the further you go from human haunts, near the coast, into the desert interior, the more numerous do the Dingoes appear, indicating that the species was a really indigenous one."

And again, alluding to its contemporaneity, mentioned above, with the great fossil Mammals of Australia, he remarks "that the Dingo was really one of the most ancient of the indigenous mammals of the country, and abounded as now most probably before man himself appeared. . . . . Our present species,

although still living in great numbers, I have no doubt dates from the Pliocene Tertiary time, and I find, on the most minute comparison and measurements, no difference between the fossil and recent individuals, either of the adult age, or of the younger periods before the milk-teeth were shed to give place to the permanent molar teeth."

These remarks from so high an authority on Australian Zoology, having the concurrence of Prof. Mivart, cannot be ignored, and, until *proof* to the contrary is forthcoming, we shall consider the honor of being the original progenitor of our household favorite as the due of the Australian Warrigal.

Furthermore, Mr. R. Etheridge, jun., has kindly supplied the following note, extracted from Smyth's Aboriginals of Victoria, i. p. 149, 1878: "In a well section at Tower Hill, Western Victoria, sixty-three feet of volcanic ash was passed through, and then sixty feet of blue and yellow clay; *here* were found the skull and bones of the Dingo." Again: "At Lake Timboon, Western Victoria, bones of the Dingo were found associated with those of the Tasmanian Devil *(Sarcophilus ursinus)*, those of *Macropus titan*, and bones and teeth of *Diprotodon*."

Suborder II.—Pinnipedia.

Seals; Walruses.

External form fitted for an aquatic life; limbs modified into swimming organs; digits of the hand decreasing in length from the first to the fifth; of the foot first and fifth largest and longest, the three middle ones subequal in length. Dentition simple, generally unspecialized, the molar series similar to each other in size and form.

Habits.—More or less purely aquatic; carnivorous, feeding on fishes, molluscs, and crustaceans, to all of which they are very destructive owing to their exceptional voracity. The development of the brain is very great, and they are, therefore, easily domesticated, becoming much attached to their keepers and readily learning various tricks; they are also affectionate parents, and courageously defend their progeny from threatened attack. A curious habit, common to all Pinnipeds, and the reason of which is still a matter for conjecture, is that of swallowing numerous stones up to the size of a hen's egg.

Distribution.—Seas of the circumpolar and temperate regions of the Globe chiefly, only one genus *(Monachus)* being strictly tropical, while but few species, one of which is the Australian *Zalophus lobatus*, range into tropical waters.

Group I.—GRESSIGRADA.

Eared Seals; Walruses.

Hind limbs capable of being turned forwards, and used in terrestrial locomotion. Neck lengthened. Anterior feet nearly as large as the posterior, their digits rapidly decreasing in length from the first to the fifth, without distinct claws, and with a broad cartilaginous border extending beyond the digits. Only the three middle digits of the hind feet clawed, and all terminating in long narrow cartilaginous flaps.

Family I.—OTARIIDÆ.

Eared Seals.

Fore limbs placed far back and comparatively free; palms and soles and the greater part of the upper digital surface hairless. Scapula large. Ears with a subcylindrical external conch. Testes scrotal.

Dentition.—I. $\frac{3}{2}$, C. $\frac{1}{1}$, M. $\frac{5}{5}$ or $\frac{6}{5}$ × 2 = 34 or 36.

Note.—The Group to which this Family belongs are gregarious and polygamous, and the males greatly exceed the females in size. During the breeding season they resort in large numbers to favorite breeding grounds, technically known to sealers as "rookeries," where they leave the water and pass some weeks on land, often at a considerable distance from the shore; at this period they rarely enter the water and consequently do not feed; the males especially, on their return to what must be considered their natural element, are greatly emaciated.

Genus I.—ZALOPHUS, *Gill* (1866).

Molars $\frac{5}{5}$, large, closely approximated, the last under the hinder edge of the zygomatic process of the maxillary. Muzzle narrow. Hinder edge of the palatine bones deeply concave. Sagittal crest, in very old males, forming a remarkably high, thin, bony plate, unparalleled in its great development in any other genus in the Family.

1. Zalophus lobatus, *Gray, sp.* (1828).

Australian Sea Lion.

In the adult the face, front and sides of the neck, all the under surface, sides, and back dark- or blackish-brown, passing into dark slaty-gray on the extremities of the limbs; the hinder half of the crown, the nape, and back of the neck rich deep fawn color; eyes black.

Dimensions.—Adult males up to ten feet; females much smaller.

Habitat.—South and West Australia; Japan.

References.—Gould, Mamm. Austr. iii. pl. xlix.; Quoy & Gaimard, Voy. Astrolabe, Zool. i. p. 95, Atlas, 1833, pls. xiv., xv.

Note.—Gilbert, writing to Gould, says, speaking of some thirty years ago: "This animal is extremely numerous on all the low islands of the Houtmann's Abrolhos, particularly those having sandy beaches; but it does not confine itself to such places, being often found on the ridges of coral and madrepores, over which we found it very painful walking, but over which the seals often outran us. On many of the islands they have been so seldom (perhaps, indeed, never before) disturbed, that I frequently came upon several females and their young in a group under the shade of the mangroves; and so little were they alarmed, that they allowed me to approach almost within the reach of my gun, when the young would play about the old ones, and bark and growl at us in the most amusing manner; and it was only when we struck at them with clubs that they shewed any disposition to attack us or defend their young. The males, however, would generally attack the men when attempting to escape; but, generally speaking, the animal may be considered harmless, for even after being disturbed, they seldom attempt to do more than take to the water as quickly as possible."

In the Prodromus of the Palæontology of Victoria (dec. v. pls. xli., xlii.) Prof. McCoy figures, under the name of *Arctocephalus williamsi*, a fossil Seal from the Pliocene of Victoria obtained at Queenscliff and Cape Otway. Referring to this Allen remarks: "The skull figured, which he (*i.e.* McCoy) refers to as an 'old male skull' bears a close resemblance to the skull of a female of *Zalophus lobatus*, from which, judging from his description and figures, it does not very materially differ.

Genus II.—ARCTOCEPHALUS, *F. Cuvier* (1824).

Molars $\frac{6}{5}$, triangular, pointed, and compressed, the last entirely behind the hinder edge of the zygomatic process of the maxillary. Muzzle slender, elongated, and pointed.

1. Arctocephalus forsteri, *Lesson*, *sp.* (1828).

Australian Sea Bear.

In the adult male the entire upper surfaces are dark brown, the belly, limbs, tail and lips chestnut; the female is of a generally lighter coloration. The young are blackish-brown above, with the muzzle and throat yellowish, and the belly rust color.

Dimensions.—Adult males up to eight feet; females to five and a half feet.

Habitat.—Southern and South-eastern Australia; New Zealand; Falkland Islands.

References.—Quoy & Gaimard, Voy. Astrolabe, Zool. i. p. 89, Atlas, pls. xii., xiii and xv.; McCoy, Prodr. Zool. Vict., decs. iv. pl. xxxi. and viii. pl. lxxi.

Note.—Referring to the islands in Bass' Straits, where these animals are still plentiful, the following extracts taken from Prof. McCoy's later article (dec. viii.) on the subject, will be read with interest: "The Seals come to the Rocks about the 1st of October. The time of bringing forth the pups is between the 10th of November and the 10th of December. They do not commence to breed until they are three years old. The male during the pupping season will ascend the rocks and remain for one or two months without food, and is extremely attentive to the female and pups. The cow generally brings forth one pup, sometimes two."

Group II.—REPTIGRADA.

Earless Seals.

Hind limbs incapable of being turned forwards, and not serviceable for terrestrial locomotion. Neck short. Anterior feet smaller than the posterior, the first digit little, if any, longer than the next succeeding ones, all armed with strong terminal claws. All the digits of the hind feet usually armed with strong claws, and without terminal cartilaginous flaps.

Family II.—PHOCIDÆ.

Earless Seals.

Fore limbs placed well forward. Hands and feet hairy. Scapula small. No external ear. Testes enclosed within the body.

Note.—The Earless Seals are monogamous, and there is no marked variation in size between the sexes. With the exception of the Sea Elephants (*Macrorhinus*), which in their habits during the season of reproduction resemble the *Otariidæ*, by assembling in large numbers at well known resorts, these Seals do not so uniformly resort to particular breeding grounds on land, but, being confined almost entirely to the colder latitudes, usually bring forth their young on the ice, and leave the water only for short periods; they are, however, as a general rule social in their habits and possessed of great affection for their young. A single

calf only is commonly brought forth, and the period of gestation is said to range from nine to nearly twelve months. Seals are greatly attracted by musical sounds, and in one instance the writer can personally vouch for a Seal *(Phoca vitulina)*, which, by the simple medium of whistling was induced to follow his boat to and from the fishing grounds for several days in succession, the animal frequently rising within an oar's length of the boat; strange to say it never attempted to seize any of the fish (mostly Cod and Ling) as they came up on the hook, though it was seen to hunt the small Sharks *(Acanthias vulgaris* and *Galeus vulgaris)* which at that season infested the waters; this occurred on the North Coast of Ireland. The food of Seals does not consist so greatly of fishes as is generally supposed, molluscs, crustaceans, and medusæ being staple articles in their diet, with an occasional bird thrown in as a *bonne bouche*. Some species, such as the Bearded Seal *(Erignathus barbatus)*, and the Ringed Seal *(Phoca fœtida)*, neither of which are to any extent migratory, are said to feed almost exclusively on small crustaceans, chiefly of the genus *Gammarus*.

Various theories have been adduced as to the remarkable power which permits these warm-blooded, air-breathing mammals to remain under water for the space of, according to different authorities, from eight to twenty minutes, but, Mr. Allen properly remarks, "none of these theories seem satisfactory."

Genus III.—OGMORHINUS, *Peters* (1875).

Molar teeth separated from one another, with distinct pointed cusps, the middle cusp being the largest and slightly recurved. Muzzle compressed and elongated.

Dentition.—I. $\frac{2}{2}$, C. $\frac{1}{1}$, M. $\frac{5}{5}$ × 2 = 32.

Note.—F. Cuvier's name, *Stenorhynchus*, having been previously employed by Latreille for a genus of Coleopterous Insects, it becomes necessary to adopt the term proposed by Dr. Peters.

1. Ogmorhinus leptonyx, *Blainville, sp.* (1820).

Sea Leopard.

Above ashy-gray with large spots and patches of yellowish-white, or greenish-gray shading into creamy-white on the sides which are blotched and spotted with black. Throat and belly grayish- or yellowish-white, with or without small dark spots.

Dimensions.—Total length up to ten feet; sexes not markedly different in size.

Habitat.—Antarctic Ocean, occasionally straggling as far north as the southern shores of Australia and New Zealand; Lord Howe Island.

References.—Gray, Voy. Erebus & Terr. Mamm. p. 4, pls. iii. iv.; Gould, Mamm. Austr. iii. pl. l.; McCoy, Prodr. Zool. Vict. dec. iii. pl. xxi.

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